This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

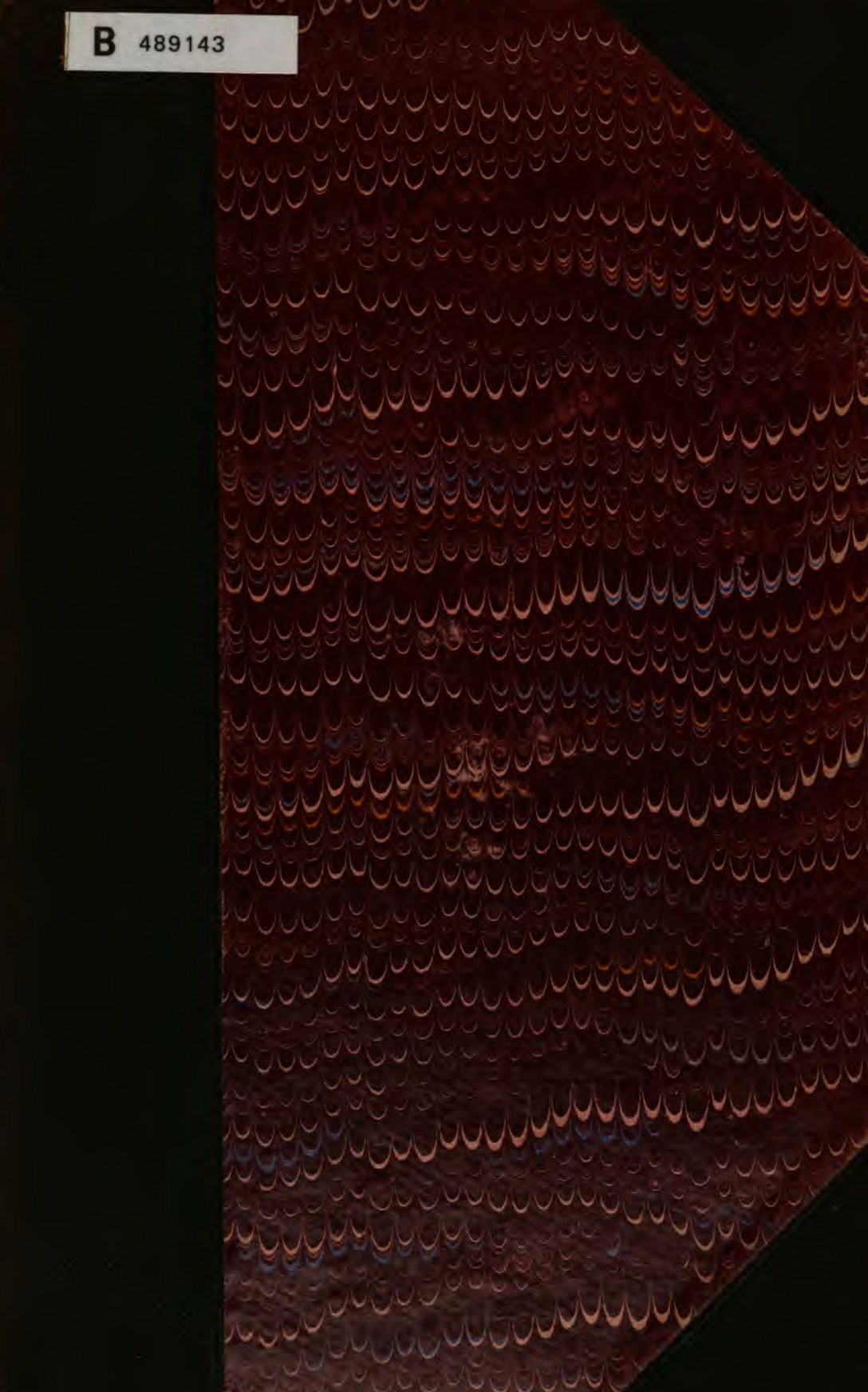
+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

B 489143



GENERAL LIBRARY
OF
UNIVERSITY OF MICHIGAN

PRESENTED BY
Prof. M. Harrington
n.d. 189

THE

SCHOOL OF MINES

5-0420

QUARTERLY.

A

JOURNAL OF APPLIED SCIENCE.

CONTENTS AND INDEX,

VOLUMES I. TO X., INCLUSIVE.

COLUMBIA COLLEGE,

NEW YORK CITY.

1890.

Science Library
TN
1
.S37
Index
V.1-10

EDITORS

OF

THE SCHOOL OF MINES QUARTERLY.

	Representing The Association of the Alumni.	*Representing* The Engineering Society.	*Representing* The Chemical Society.
Vol. I.		Chandler D. Starr, '81, Wheaton B. Kunhardt, '80.	Alfred L. Beebe, '80, Ferdinand G. Wiechmann, '81.
Vol. *II.	Henry S. Munroe, '69, Elwyn Waller, '70, Pierre deP. Ricketts, '71.	Edward K. Dunham, '81, Alfred J. Moses, '82, William F. Staunton, Jr., '82, Willard A. Shumway, '82.	Alfred L. Beebe, '80, E. Austin Oothout, '82, Thomas D. O'Connor, '81, Ferdinand G. Wiechmann, '81, Charles A. Wittmack, '82.
Vol. III.	Henry S. Munroe, '69, Elwyn Waller, '70, Pierre deP. Ricketts, '71.	Alfred J. Moses, '82, William F. Staunton, Jr., '82, George A. Suter, '83.	Charles A. Wittmack, '82. Ferdinand Sands, '82, William H. Cooper, '82.
Vol. IV.	Henry S. Munroe, '69, Elwyn Waller, '70, Pierre deP. Ricketts, '71.	Robert Peele, Jr., '83, Fred. Powell, '83, William F. Morgan, '84.	Walter H. Weed, '83, Charles F. McKenna, '83, Wilmot W. Burritt, '84.
Vol. V.	John K. Rees, '75, James B. Mackintosh, '77, Alfred L. Beebe, '80.	William F. Morgan, '84, Samuel S. Fowler, '84, Daniel E. Moran, '84.	Charles S. McLoughlin, '84, Charles A. Painter, '84, Fred. J. H. Merrill, '85.
Vol. VI.	John K. Rees, '75, James B. Mackintosh, '77, Herman T. Vulté, '81.	Arthur S. Dwight, '85, Charles F. Lacombe, '85, Ernest J. H. Amy, '85.	Fred. J. H. Merrill, '85, R. Van A. Norris, '85, Wilton G. Berry, '86.
Vol. VII.	John K. Rees, '75, James B. Mackintosh, '77, Alfred J. Moses, '82, Alfred L. Beebe (resigned), James L. Greenleaf, '80.	James J. Ormsbee, '86.	Ernest A. Congdon, '87.
Vol. VIII.	John K. Rees, '75, James B. Mackintosh, '77, Alfred J. Moses, '82, James L. Greenleaf, '80.	Henry Parsons, '88.	Ernest A. Congdon, '87.
Vol. IX.	John K. Rees, '75, James B. Mackintosh, '77, Alfred J. Moses, '82, James L. Greenleaf, '80.	Rudolph P. Miller, '88.	Henry G. Atha, '89.
Vol. X.	John K. Rees, '75, Alfred J. Moses, '82, James L. Greenleaf, '80, Nathaniel L. Britton, '79.	Robert M. Raymond, '89.	Thomas M. St. John, '90.

ASSOCIATE EDITORS, VOLS. VI. to X.

F. A. P. Barnard, J. S. Newberry, T. Egleston, W. P. Trowbridge, H. S. Munroe, F. R. Hutton, Elwyn Waller, P. de P. Ricketts, M. W. Iles, H. B. Cornwall, P. T. Austen, C. M. Rolker, J. A. Church, W. B. Potter, S. A. Reed, W. B. Devereux, J. M. Adams, H. M. Wilson, J. C. F. Randolph. J. B. Mackintosh (added Vol. X.)

---

* The board was reorganized after the second number of Vol. II. to admit representatives from the Alumni Society.

Natural Resources
Transfer
2/24/54
Science Library
5-28-54

PREFACE.

The work of preparing this index has been done in part by elaborating the volume indexes and in part by a reindexing. Proofs of the compilation were submitted to specialists by whom the titles were referred to subjects.

The editors desire to thank Messrs. Elwyn Waller, N. L. Britton, J. L. Greenleaf and Jos. Struthers for assistance rendered.

CONTENTS, VOLS. I. TO X.

SCHOOL OF MINES QUARTERLY.

Vol. I. No. 1. November, 1879.

PAGE

The Pedometer as a Surveying Instrument. H. S. Munroe, ... 1
Coffee and its Adulterations. F. G. Wiechmann, ... 8
The Manufacture of Fire Brick and Terra-Cotta. A. M'L. Parker, . 16
Chloral. A. P. Hallock, ... 22
Building Stones—I. Their Properties and Uses. J. L. Greenleaf, . . 27
Editorial, ... 40
Professional Notes, ... 41

Vol. I. No. 2. January, 1880.

Parting Gold and Silver in California. T. Egleston, ... 43
Building Stones—II. Their Properties and Classification. J. L. Greenleaf, ... 52
Compound Platinates and a New Platino-Potassium Salt. L. Pitkin, 64
The Dynagraphometer. L. M. Hooper, ... 70
Stimulants and Narcotics. F. T. Aschmann, ... 74
Correspondence, ... 81
Professional Notes, ... 82

Vol. I. No. 3. March, 1880.

The Origin and Classification of Ore-Deposits. J. S. Newberry, . . . 87
Some Mexican Notes. J. C. F. Randolph, ... 105
Aerostation. J. A. Navarro, ... 110
Soap. A. L. Colby, ... 119
Correspondence, ... 126
Professional Notes, ... 128

Vol. I. No. 4. May, 1880.

Sanitary Problems of New York City. W. P. Trowbridge, ... 131
Artificial Diamonds. L. Pitkin, ... 140
Mechanical Engineering and the Civil Engineer. C. D. Starr, ... 148
Projected Intersections. E. K. Dunham, ... 155
On the Volumetric Determination of Sulphur and Sulphuric Acid. A. H. Elliott, ... 166
A New Planimeter. L. M. Hooper, ... 169
Direct-Acting Pumping Engines. H. A. Wheeler, ... 173
Nickel and Cobalt Separation. C. A. Meissner, ... 184
Wire Rope Railroads in San Francisco. W. F. Williams, ... 187
Editorial, ... 196
Professional Notes, ... 198

Vol. II. No. 1. November, 1880.

The Genesis of our Iron Ores. J. S. Newberry, ... 1
Gold and Silver Refining at the Assay Office, New York City. E. E. Sage, ... 18
The Volumetric Determination of Copper. A. H. Elliott, ... 23
Paper-Hangings. A. L. Colby, ... 27

Steam Hammers. M. J. O'Connor, ... 35
Chemical Action of Light. F. G. Wiechmann, ... 42
Professional Notes, ... 47

Vol. II. No. 2. January, 1881.

Phenol or Carbolic Acid—Qualitative and Quantitative Tests. E. Waller, 49
Precious Stones. H. T. Vulté, ... 58
Notes on the Bethnal Green Museum, London. F. T. Aschmann, . . . 71
The Docks of New York. W. M. Meserole, ... 78
Casting and Founding. W. H. Cooper, ... 85
Professional Notes, ... 92

Vol. II. No. 3. March, 1881.

Editorial, ... 95
On the Action of Gold Concentrated Sulphuric Acid on Lead and its Alloys. L. Pitkin, ... 97
The Westmoreland Shaft. W. P. Little and T. B. Stearns, ... 103
The Pastrana Mine. J. C. F. Randolph, ... 107
Surveying of Mining Claims in Colorado. R. A. Parker, ... 116
Steam on the Canals—I. C. D. Starr, ... 127
Professional Notes, ... 138
Student Department, ... 143
Graduate Department, ... 150

Vol. II. No. 4. May, 1881.

On the Geology of Richmond County, N. Y. N. L. Britton, ... 165
Iron Assay Notes. T. B. Stearns, ... 173
Action of Concentrated Sulphuric Acid at 100° C. on Lead and its Alloys. L. Pitkin, ... 177
Steam on the Canals—II. C. D. Starr, ... 182
Under-Ground Haulage in the Coal Mines of Pennsylvania. H. V. F. Furman and A. E. Swain, ... 194
What is the Cause of Isomerism in the Aromatic Series? L. Friedburg, 201
Professional Notes, ... 211
School of Mines Notes, ... 220
Graduate Department, ... 225
Additions to the School of Mines Library since October, 1880, ... 235

Vol. III. No. 1. November, 1881.

Memorandum as to the Proposed Course of Architecture in the School of Mines. W. R. Ware, ... 1
The Genesis and Distribution of Gold. J. S. Newberry, ... 6
An Apparatus for the Rapid Analysis of Mixtures of Gases. A. H. Elliott, ... 16
Sanitary Condition of City Houses. F. N. Owen, ... 21
Inaccessible Distances in Surface and Under-Ground Surveying. H. S. Munroe and J. W. Davis, ... 25
On Electro-Silver Plating. C. A. Wittmack, ... 30
The Marquette Iron Region—I. Students of the Summer School of Practical Mining, ... 35
Professional Notes, ... 49

School of Mines Notes, ... 56
Additions to the School of Mines Library since May, 1881, ... 60
Graduate Department, ... 62

Vol. III. No. 2. January, 1882.

The Progress of the Metallurgy of Gold and Silver in the United States—I. T. Egleston, ... 71
The Marquette Iron Region—II. The Students of the Summer School of Practical Mining, ... 103
Reclamation of Tide-Land at Marshfield, Mass. Wm. Hill, ... 118
Dry Concentration at Frisco, Utah. H. Van F. Furman, ... 127
Aurora, Nevada—A Little of its History, Past and Present. H. G. Clark, ... 133
Professional Notes, ... 137
School of Mines Notes, ... 147
Additions to the School of Mines Library since October, 1881, ... 151
Graduate Department, ... 153

Vol. III. No. 3. March, 1882.

The Progress of the Metallurgy of Gold and Silver in the United States—II. T. Egleston, ... 157
Determination of Heating Surface Required in Ventilating Flues. W. P. Trowbridge, ... 171
Endless Rope-Haulage at the Blossburg Mine, Arnot, Pa. W. B. Parsons, ... 182
The Marquette Iron Region—III. Students of the Summer School of Practical Mining, ... 197
Mines of the Appalachian Range. G. B. Hanna, ... 208
Professional Notes, ... 215
School of Mines Notes, ... 225
Additions to the School of Mines Library since December, 1881, ... 229
Graduate Department, ... 231

Vol. III. No. 4. May, 1882.

The Marquette Iron Region—IV. Students of the Summer School of Practical Mining, ... 243
Ore Sampling. S. A. Reed, ... 253
Determination of Zinc as a Pyrophosphate. G. C. Stone, ... 260
San Juan Mine. F. D. Browning, ... 264
Mine Surveying. G. A. Suter and H. S. Munroe, ... 269
Sinking of Shift "B," Barnum Mine, Ishpeming, Mich. R. H. Vondy, 277
The Inclined Planes of the Morris Canal. H. M. Wilson, ... 283
Determination of "Total Carbon" in Steel and Pig-Iron. H. F. Starr, 290
Professional Notes, ... 292
School of Mines Notes, ... 307
Additions to the School of Mines Library since February, 1882, ... 308
Graduate Department, ... 310

Vol. IV. No. 1. November, 1882.

The Dry Concentration of Ores. J. S. Newberry, ... 1
Treatment of Enargite. T. Egleston, ... 5
Some Notes upon the Berlin Stadtbahn. J. A. Navarro, ... 9

On Nitroglycerine. A. H. Elliott, ... 15
On Nitrosaccharose. A. H. Elliott, ... 17
Notes on River and Harbor Surveys. T. H. Leggett, ... 23
Improvement of the Wisconsin and Fox Rivers. S. B. Downes, . . . 30
Professional Notes, ... 42
School of Mines Notes, ... 64
Additions to the Library of the School of Mines since May, 1882, . . . 66
Graduate Department, ... 70

Vol. IV. No. 2. January, 1883.

Ritter's Arbitrary Assumption in his "Method of Moments," and the Resulting Restrictions. J. L. Greenleaf, ... 86
The Hudson River Tunnel. A. L. Walker, ... 90
Method of Working in Thick Deposits of Iron-Ore. S. W. Balch, . . . 98
Handling of Coal in the Anthracite Mines of Pennsylvania. F. Powell and T. W. Ridsdale, ... 100
Iron Mines of New Jersey. Students of the Summer School, ... 111
A Native Process of Smelting Copper-Ores in the State of Jalisco, Mexico. W. B. Devereux, ... 122
Professional Notes, ... 126
School of Mines Notes, ... 150
Graduate Department, ... 154

Vol. IV. No. 3. April, 1883.

On the Physical Conditions under which Coal was Formed. J. S. Newberry, ... 169
Ozone Reactions. L. P. Gratacap, ... 174
The Present Aspect of Ore-Dressing in Europe—I. W. B. Kunhardt, . 179
The Copper Deposits of Vermont. H. A. Wheeler, ... 219
Professional Notes, ... 225
School of Mines Notes, ... 247
Graduate Department, ... 249

Vol. IV. No. 4. June, 1883.

Stone Cutting. W. P. Trowbridge, ... 265
Signal Tripods for Trigonometrical Stations. C. F. Ferrer, ... 277
The U. S. Geological Survey. R. D. Irving, ... 284
The Present Aspect of Ore-Dressing in Europe—II. W. B. Kunhardt, 298
An Explosion Burette for Rapid Gas Analysis. A. H. Elliott, ... 322
Graduate Department, ... 326

Vol. V. No. 1. November, 1883.

The Study of Chemistry in Germany. S. B. Newberry, ... 1
The Present Aspect of Ore-Dressing in Europe—III. W. B. Kunhardt, 8
Steel Analysis. W. F. Brugman, ... 34
Frogs and Switches. W. B. Parsons, Jr., ... 38
The Hanging Compass and Arc for Mine Surveying. T. H. Leggett, . 46
A Combustion Crucible. A. P. Hallock, ... 47
Frame for Large Blue-Prints. W. B. Parsons, Jr., ... 49
Professional Notes, ... 51
School of Mines Notes, ... 64

Additions to the School of Mines Library since October 1, 1882, ... 71
Graduate Department, ... 74

Vol. V. No. 2. January, 1884.

The Metrological System of the Great Pyramid—I. F. A. P. Barnard, 97
Cranes. F. R. Hutton, ... 127
Herderite, a Calcium and Glucinum Phosphate and Fluoride. J. B. Mackintosh, ... 131
The Carpenter Continuous Automatic Air-Brake. J. A. Navarro, . . . 132
Standard Time. J. K. Rees, ... 136
The Present Aspect of Ore-Dressing in Europe—IV. W. B. Kunhardt, 140
Professional Notes, ... 154
School of Mines Notes, ... 173
Graduate Department, ... 177

Vol. V. No. 3. March, 1884.

The Metrological System of the Great Pyramid—II. F. A. P. Barnard, 193
Manganese in Slags, formed by Argentiferous Lead-Smelting. M. W. Iles, ... 217
Gases Contained in Steel. Translated by T. Egleston, ... 224
On the Writing of Chemical Equations. F. G. Wiechmann, ... 235
Mining Law. E. P. Clark, ... 242
Professional Notes, ... 259
School of Mines Notes, ... 280
Graduate Department, ... 282

Vol. V. No. 4. May, 1884.

The Metrological System of the Great Pyramid—III. F. A. P. Barnard, 289
The Deposition of Ores. J. S. Newberry, ... 329
Water Analysis. H. B. Cornwall, ... 344
Decomposition and Analysis of Slags. M. W. Iles, ... 351
Gold Chlorination in California. F. D. Browning, ... 359
A General Clean-up at the North Bloomfield Gravel Mine. W. H. Radford, ... 373
Professional Notes, ... 378
Library Notes, ... 382
Book Reviews, ... 386
Graduate Department, ... 389

Vol. VI. No. 1. November, 1884.

On the Thermal Effect of the Action of Aqueous Vapor on Feldspathic Rocks. (Kaolinization). C. Barus, ... 1
The Determination of Manganese in Spiegel. G. C. Stone, ... 24
Manganese Methods. J. B. Mackintosh, ... 35
Geodetic and Topographic Surveying. H. M. Wilson, ... 37
Native Silver Ores and their Treatment at Batopilas. T. H. Leggett, . 57
Mœris.—The Wonder of the World. F. C. Whitehouse, ... 71
Comparison of Cast of Power in Exhaust, and Plenum Ventilation for Mines and Dwellings. W. P. Trowbridge, ... 82
School of Mines Notes, ... 84
Library Notes, ... 86
Book Reviews, ... 88
Graduate Department, ... 92

Vol. VI. No. 2. January, 1885.

Iridium—Its Occurrence, Fusion, Electroplating and Applications in the Arts. N. W. Perry, ... 97
The Mechanics of the Friction Clutch. S. W. Balch, ... 118
The Island-Pyramids in the Lake of Mœris. F. C. Whitehouse, . . . 130
Notes on Two Ore-Deposits of New Mexico. H. Van F. Furman, . . 138
The Eroding Power of Ice. J. S. Newberry, ... 142
The Modulus of Hydrometers. E. Waller and N. Hathaway, ... 153
The Determination of Graphite in Minerals. J. B. Mackintosh, ... 159
The late Henry Watts, ... 160
rofessional Notes, ... 163
Abstracts, ... 165
Book Reviews, ... 169
Graduate Department, ... 174

Vol. VI. No. 3. March, 1885.

The Pyramid-Hill of Gizeh. F. C. Whitehouse, ... 193
The Relation of United Strain and Thrust in Arches. The "Middle Third" Theory for Stone Arches. James L. Greenleaf, ... 209
Haswell and Whitworth's Steel Forgings. T. Egleston, ... 216
Ore Testing Works of the School of Mines, ... 224
The Relation of Aluminic and Ferric Salts to Plant Life. P. T. Austen, 235
arting Gold and Silver by means of Iron at Lautenthal. T. Egleston, 240
Some Thoughts on the Practical Management of Public Works. E. B. Coxe, ... 251
The Inversion-Process Applied to Beet-Root Sugars. F. G. Wiechmann, ... 257
The Partial Solar Eclipse of March 16th. J. K. Rees, ... 261
A Greek Tunnel of the Sixth Century B.C. A. C. Merriam, ... 264
The Hübl Method for Testing Oils and Fats. W. Moeller, ... 276
The Watts Fund, ... 280
Professional Notes, ... 281
Abstracts, ... 282
Book Reviews, ... 287

Vol. VI. No. 4. May, 1885.

Masonry Supports for Hanging Walls at the Tilly Foster Iron Mines. L. G. Engel, ... 289
Bessemerizing Copper Mattes. T. Egleston, ... 320
Chlorides in Rainfall of 1884. L. P. Gratacap, ... 335
Tables for the Determination of Minerals. A. J. Moses, ... 339
The Planimeter. E. L. Ingram, ... 347
More Remarks on Ore Sampling. S. A. Reed, ... 351
Going into Blast with Anthracite Furnaces. T. Egleston, ... 358
Notes on the Production of Copper in Arizona. W. E. Newberry, . . 370
Abstracts, ... 375
Graduate Department, ... 376

Vol. VII. No. 1. October, 1885.

Parting Gold and Silver in the U. S. Assay Office, N Y. City. T. Egleston, ... 1

The Electrical and Magnetic Properties of the Iron Carburets, ... 24
Measurement of Light Obstruction. J. L. Greenleaf, ... 35
Basic Open-Hearth Steel Process. T. Egleston, ... 49
The Influence of the Technical Sciences upon General Culture. Prof. F. Reuleaux, ... 67
Book Reviews, ... 95
Abstracts, ... 100

Vol. VII. No. 2. January, 1886.

Working Placer Deposits in the United States. T. Egleston, ... 101
Turnouts from Combination Track. E. G. Tuttle, ... 131
Improvised Surveying Instruments. J. L. Greenleaf, ... 145
The Luray Caverns. G. Lusk, ... 148
Uneducated Reason in the Cicada. J. S. Newberry, ... 152
The Pyrites Deposits of the Alleghanies—I. A. F. Wendt, ... 154
A Recently Discovered Meteoric Iron from Independence Co., Arkansas. W. E. Hidden, ... 188
Book Reviews, ... 192
Abstracts, ... 193
Alumni Association Notes. 194

Vol. VII. No. 3. April, 1886.

Some New Mining Cases. W. P. Butler, ... 197
The Bisulphide of Carbon Engine. W. P. Trowbridge, ... 210
The Pyrites Deposits of the Alleghanies—II. A. F. Wendt, ... 218
The Thick Coal of South Staffordshire. H. W. Hughes, ... 235
The Parting Process used in the U. S. Mint at Philadelphia. T. Egleston, ... 253
Officers and Members of the Alumni Association of the School of Mines, ... 283

Vol. VII. No. 4. July, 1886.

The Pyrites Deposits of the Alleghanies—III. A. F. Wendt, ... 301
Graphic Tables for the Reduction of Stadia Measurements. B. Willis, 323
The Classics and Natural Science at a German Gymnasium. C. A. Stetefeldt, ... 326
On False Pseudomorphs of Quartz. W. E. Hidden, ... 334
The Rees Rifle for Military and Sporting Purposes. B. F. Rees, . . . 338
On the Relative Economy of Ventilation by Heated Chimneys and Ventilation by Fans. W. P. Trowbridge, ... 347
The Right of Lateral Pursuit. W. P. Butler, ... 357
The Point Shirley Copper Works. T. Egleston, ... 360
The Action of Hydrofluoric Acid on Silica and Silicates. (Preliminary Note:) J. B. Mackintosh, ... 384
Book Reviews, ... 386

Vol. VIII. No. 1. October, 1886.

Earthquakes. J. S. Newberry, ... 1
Elective Studies. F. A. P. Barnard, ... 20
On a Meteoric Iron from South Carolina. W. E. Hidden, ... 31
The Mendheim Continuous Gas Furnace for Burning Fire-Brick and Porcelain. T. Egleston, ... 35

Notes on Railway Block Signals. F. R. Hutton, ... 54
Some Old Gold Mills. F. N. Holbrook, ... 61
Line of Origin of the Charleston Earthquake. E. Starek, ... 64
Influence of Copper on the Estimation of Sulphur. W. F. Brugman, . 74
In Camp on a Preliminary Survey. W. H. Stuart, ... 75
Notes on the Analysis of Chrome Paints. W. L. Brown, ... 81
Book Reviews, ... 86
Abstracts, ... 90

Vol. VIII. No. 2. January, 1887.

On New Features in Teledynamic Transmitters—I. Prof. Reuleaux, . 93
On the Action of Hydrofluoric Acid on Silica and Silicates. J. B. Mackintosh, ... 115
Treatment of Gold in the Arrastra. T. Egleston, ... 125
The Great Telescopes of the World. J. K. Rees, ... 135
Analysis of Franklinite and Some Associated Minerals. G. C. Stone, 148
Our Grandest Mountain and Deepest Forest. B. Willis, ... 152
A Letter from President Barnard, ... 164
Additions to the Columbia College Library in the Department of Natural Science, Useful and Fine Arts, October to December, 1886, ... 167
Index to Current Literature Relating to American Geology—I. F. J. H. Merrill, ... 172
Professional Notes, ... 174
Abstracts, ... 180

Vol. VIII. No. 3. April, 1887.

Sub-Surface Water Supplies. W. P. Trowbridge, ... 191
Drift-Mining—I. T. Egleston, ... 204
On New Features in Teledynamic Transmitters—II. Prof. Reuleaux, . 220
The Durant-Emma Case. W. P. Butler, ... 235
Topography and Structure in the Bays Mountains, Tenn. B. Willis, . 242
On the Action of Sulphurous Anhydride on Benzine. C. E. Colby and C. S. McLoughlin, ... 253
The Columbia College Centennial, ... 257
Additions to the Columbia College Library in the Department of Natural Science, Useful and Fine Arts, January to March, 1887, . 282
Index of Current Literature Relating to North American Geology—II. F. J. H. Merrill, ... 285
Notes and Abstracts, ... 286
Book Reviews, ... 288

Vol. VIII. No. 4. July, 1887.

Drift Mining—II. T. Egleston, ... 289
Color-Contrast. O. N. Rood, ... 307
Concentrated Rolling Loads. R. W. Hildreth, ... 317
Geological Notes—I. J. S. Newberry, ... 327
The Separation of Nickel and Cobalt from Iron. J. B. Mackintosh, . . 335
Concentration of Gold and Silver Ores on the Pacific Coast. J. M. Adams, ... 336

Scheme for Qualitative Blowpipe Analysis. A. J. Moses, ... 359
The Comparative Delicacy of Some Qualitative Tests. J. S. C. Wells, 366
Inter-Collegiate Boat Racing. W. P. Trowbridge, ... 368
Additions to the Columbia College Library in the Department of Natural Science, Useful and Fine Arts, April to May, 1887, ... 373
Index to Current Literature Relating to North American Geology—III. F. J. H. Merrill, ... 375
Notes and Abstracts, ... 376
Book Reviews, ... 382

Vol. IX. No. 1. October, 1887.

Sinking a Shaft Through Loose Material at the "Tilly Foster Mine." A. McC. Parker, ... 1
On Flint's Investigation of the Nicaraguan Woods. R. H. Thurston, 6
On Recent Field Work in the Archæan Areas of Northern New Jersey and Southeastern New York. N. L. Britton, ... 33
Invention and Skill. F. H. Richards, ... 40
The Burlington Brake-Tests. H. Hollerith, ... 43
What are the Requirements for a Course in Electrical Engineering at a Technical School. F. R. Hutton, ... 69
Notes on the Ore-Deposits and Ore-Dressing in Southeastern Missouri. J. F. Kemp, ... 74
Some Causes of Error in Blank Analysis. J. B. Mackintosh, ... 81
Additions to the Columbia College Library in the Department of Natural Science, Useful and Fine Arts, June to September, 1887, . . 83
Index to Current Literature Relating to American Geology—IV. F. J. H. Merrill, ... 85
Professional Notes, ... 88
Abstracts, ... 93
Book Reviews, ... 95

Vol. IX. No. 2. January, 1888.

The Future of Gold and Silver. J. S. Newberry, ... 97
On the Theories of the Lateral Pressure of Sand Against Retaining Walls. M. Merriman, ... 109
The Marble of Hawkins County, Tennessee. B. Willis, ... 112
The Extraction of Copper at Agordo—I. T. Egleston, ... 124
On the Movement of Solid Bodies in Water. H. S. Munroe, ... 140
On the Dressing of Non-Bessemer Ores. G. W. Maynard and W. B. Kunhardt, ... 145
The Distillation of Pine Wood in the South. F. S. Clark, ... 162
The Knickerbocker Avenue Sewer Outlet. E. Schöney, ... 178
Additions to the Columbia College Library in the Department of Natural Science, Useful and Fine Arts, October to December, 1887, . 186
Index to Current Literature Relating to American Geology—V. F. J. H. Merrill, ... 188
Notes and Abstracts, ... 189

Vol. IX. No. 3. April, 1888.

Systems of Weight and Measure—I. F. A. P. Barnard, ... 193
Notes on Lead-Smelting in Southeastern Missouri. J. F. Kemp, . . . 212
The Value of Water-Power Considered in Relation to Indemnity to Riparian Owners where the Water of a Stream is taken for Public Use. W. P. Trowbridge, ... 220
The Kjeldahl Process for the Determination of Nitrogen. E. Waller and H. C. Bowen, ... 240
Some Notes on Bridge Steel. R. W. Hildreth, ... 248
The Extraction of Copper at Agordo—II. T. Egleston, ... 256
A Contribution to the Theory of Jigging. H. S. Munroe, ... 278
The Theories for Retaining-Walls. R. H. Thurston, ... 286
The Proposed Audubon Memorial, ... 288
Additions to the Columbia College Library in the Department of Natural Science, Useful and Fine Arts, January to March, 1888, . . 289

Vol. IX. No. 4. July, 1888.

Systems of Weight and Measure—II. F. A. P. Barnard, ... 291
Machine-Mining in the St. Louis Coal Region. H. A. Wheeler, . . . 299
Town's Truss. W. P. Trowbridge, ... 315
The Appraisement of Damages to Water-Powers in the Exercise of the Right of Eminent Domain. W. P. Butler, ... 319
The Coals of Colorado. J. S. Newberry, ... 327
The Relation of the Electrical Units of Measurement to the Dynamic Units. F. R. Hutton, ... 341
Definition of "The Engineer." E. B. Coxe, ... 346
Electric Signaling in Mines. E. Z. Burns, ... 357
Rosenbusch's Microscopic Physiography of the Massive Rocks—I, . . 362
The Calculation of Charge for Lead Furnaces. E. L. Newhouse, . . . 373
Additions to the Columbia College Library in the Department of Natural Science, Useful and Fine Arts, April to May, 1888, ... 377
Professional Notes and Abstracts, ... 380
Book Reviews, ... 386

Vol. X. No. 1. November, 1888.

Notes on Preliminary and Location Railroad Surveying in the West. W. Newbrough, ... 1
Determination of Invert-Sugar by Alkaline Copper Solutions. F. G. Wiechmann, ... 11
The Instruction in Architecture at the School of Mines. W. R. Ware, 29
Rosenbusch's Microscopic Physiography of the Massive Rocks—II, . 43
A Brief Review of the Literature on Ore-Deposits—I. J. F. Kemp, . . 54
High Bridge, New York. C. D. Starr, ... 61
Geological Notes—II. J. S. Newberry, ... 66
Conditions Affecting the Flow of Streams at the Upper Waters of the Mississippi and Vicinity, ... 72
The Field-Work of a Survey for an Elevated Road over a Crowded Thoroughfare. A. McC. Parker, ... 84
Additions to the Columbia College Library in the Department of Natural Science, Useful and Fine Arts, June to October, 1888, . . . 91
Book Reviews, ... 93

Vol. X. No. 2. January, 1889.

The Oil Fields of Colorado. J. S. Newberry, ... 97
Patent Processes. Emil Starek, ... 102
A Brief Review of the Literature on Ore-Deposits—II. J. F. Kemp, . 116
The Transformation of Electricity into Mechanical Energy. W. H. Erb, 123
The Eruption of Krakatoa in 1883. J. I. Northrop, ... 132
Notes on Some Chemical Qualities of Foundry Irons. C. A. Meissner, 147
The Manufacture of Chemical Fibre. E. A. Congdon, ... 163
Electrical Engineering at Columbia College, ... 172
List of Books on Mining. H. S. Munroe, ... 176
Notes and Abstracts, ... 185
Book Reviews, ... 191

Vol. X. No. 3. April, 1889.

The Lundberg Case. E. Waller, ... 193
A few Words in Regard to the Sewerage and Drainage of the Village of New Brighton, Staten Island. A. Hollick, ... 202
Methods of Modern Petrography. H. Hensoldt, ... 212
Western Union Time System. F. R. Bartlett and R. P. Miller, ... 218
An Economical Method of Prospecting in Soft Ground. F. S. Ruttmann, ... 234
An Electric Tabulating System. H. Hollerith, ... 238
A Scheme for the Separation and Detection of Al, Cr, Fe, Co, Ni, Mn, Zn, Ba, Ca, Sr, Mg, in the Presence of Phosphoric, Arsenic, Oxalic, Boric, Silicic, Hydrofluoric, Acetic, Tartaric Acids and Organic Matter. J. S. C. Wells and H. T. Vulté, ... 255
Winding Engines. H. W. Hughes, ... 258
Notes and Abstracts, ... 274

Vol. X. No. 4. July, 1889.

The Street Pavements of New York. Prof. J. S. Newberry, ... 289
An Apparatus for Determining the Relative Degree of Cohesion of a Semi-Liquid Body. H. C. Bowen, ... 297
A Discussion of Certain Points in Connection with Sewerage and Drainage in the Village of New Brighton, Staten Island. Arthur Hollick, 302
Graphitic Anthracite in the Parker Mine, Wood River, Idaho. Walter P. Jenney, ... 316
Notes on the Dry Lakes of Southern Nevada and California, with Relation to the Loess. Walter P. Jenney, ... 316
Chronology of the Human Period. J. Woodbridge Davis, ... 318
Notes on Blowpipe Analysis. A. J. Moses, ... 320
A Brief Review of the Literature on Ore-Deposits. J. F. Kemp, . . . 326
Committee Appointed to Consider the Best Method of Establishing International Standards for the Analysis of Iron and Steel 336
The School of Mines. J. H. Van Amringe, ... 338
"Fuel Oil" for Stationary Boilers in New York City. H. F. J. Porter, . 351
Abstracts, ... 370

SCHOOL OF MINES QUARTERLY,

INDEX, VOLS. I. TO X.

November, 1879, to July, 1889.

Abstracts are printed in italics; the names of minerals are only under the title Mineralogy.

A

		PAGE
ABT'S Railway	IV.,	62
ACCIDENTS Due to Break in Continuity of Track	VIII.,	54
in Marquette Mines	III.,	250
to Rolling Stock and Machinery	VIII.,	54
ACETIC and Other Salts, from Wood	IX.,	164
ACIDS, Fatty, in Soap	V.,	277
ACID Fumes, Condensation	VII.,	14
Hydrobromic, Preparation	V.,	60
ACTION of Hydrofluoric Acid on Silica and Silicates	VIII.,	115, 384
of Sulphurous Anhydride on Benzine	VIII.,	253
ADAMS, J. M., Concentration of Gold and Silver-Ores on the Pacific Coast,	VIII.,	336
ADIRONDACK MAGNETITE, Dressing	IX.,	151
ADULTERATION of Coffee	I.,	8
ÆROSTATION	I.,	110
AGORDO Copper Extraction	IX.,	124, 256
AIR-BRAKE, Carpenter Continuous Automatic	V.,	132
AIR-COMPRESSORS at Republic Mine	III.,	245
AIR-LOCKS	IV.,	94
AIR-WAVES at Krakatoa	X.,	142
Alabama Iron and Coal Resources	IV.,	225
Albumen Preparation	VI.,	285
ALCOHOL, Water in	I.,	130
ALCOHOLIC STIMULANTS	I.,	75
Alignment of Tunnel Headings of Croton Aqueduct	IX.,	191
ALKALIMETRIC TITRATIONS	X.,	370
ALKALINE Copper Solution, Determination Invert Sugar by	X.,	11
ALKALOIDS, in Stimulants and Narcotics	I.,	78

PAGE

Aluminium, Manufacture..... IV., 239; VI, 284
and Zirconium Separation..... X, 279
ALUMNI ASSOCIATION:
LISTS of Members and Changes of Addresses:
II.....157, 230
III.....233, 311
IV.....71, 156, 250, 341
V.....81, 179, 285, 395
VI..... 178
VII 283
VIII 385
Meetings, etc.:
II.....150, 229
III.....63, 151
V.....76, 177, 282, 389
VI.....92, 175, 376
VII 194
X..... 185
AMALGAMATION prevented by film or by hammering.....III., 95
AMERICAN GEOLOGY. Index to Current Literature, VIII., 172, 285, 375; IX., 85, 188
Metrological Society.....VIII., 176
Ammonia Test for Mercury.....X., 372
ANALYTICAL CHEMISTRY. See also Assaying.
ALCOHOL, Water in.....I., 130
Alkalies in Argentic Nitrate.....IV., 52
AMMONIUM FLUORIDE, purification.....V., 164
Antimonic Acid, Volumetric.....IV., 54; X., 280
Antimony and Tin, Electrolytic.....X., 280
in Minerals, Detection.....X., 280
Arsenic, Estimation.....I., 85; IV., 53; V., 59
in Wall Papers, Textile Fabrics, etc......X., 280
ASBESTUS in Carbon Filter.....III., 291
Bismuth, Blowpipe Test.....I., 85, 126
Volumetric Determination.....IV., 54
Blank Analyses, Errors in.....IX., 81
Blowpiping.....VIII., 359; X., 320
Boracic Acid, Volumetric.....V., 58
in Alkalimetry.....V., 163
Cadmium Estimation.....IV., 53
CARBOLIC Acid, Tests.....II., 49
Carbon in Iron and Steel, Estimation of.....III., 290; IV., 52
in Phosphorus.....V., 278
Monoxide in Air.....X., 379
Caustic Alkali, by Modified Nessler.....X., 277
in Presence of Carbonates.....IV., 52; X., 277
Chlorine and Hydrochloric Acid.....X., 281
and Iodine by Dry Method.....VI., 28
in Organic Compounds.....X., 375
Bromine and Iodine.....V., 278

PAGE

ANALYTICAL CHEMISTRY.—*Continued.*

Chlorine, Gravimetric.....IV., 51
Indirect.....IV., 51
Chrome Paints.....VIII., 81
Chromic Acid in Potassic Dichromate.....IV., 52
Chromium, Estimation.....IV., 53
in Iron-Ores.....IV., 53
Volumetric.....III., 223
Chromium-Acetate in Iron, etc......V., 60
COBALT and Nickel, *Separation*.....VIII., 335; X., 277, 371
Volumetric for.....X., 280, 374
and Zinc, Separation.....X., 371
Electrolytic Deposition.....X., 284
COFFEE and Adulterations.....I., 8
Colorado Coals.....IX., 341
COMBUSTION Crucible.....V., 47
Spontaneous by HNO_3.....III., 302
Tube.....III., 291
Copper, Electrolytic.....X., 374
Volumetric.....II., 23
Copper Salt, Reactions.....X., 373
Cuprous Oxide in Metallic Copper.....X., 281
with Cupric.....IV., 53
Dithio-Carbaminate as a Reagent.....X., 276
Drying Precipitates.....IV., 50
Fats and Oils, Examination.....VI., 285
Hübl Method.....VI., 276
Fatty Acids in Soap.....V., 277
Ferric Iron, Reduction.....X., 278
Filter for Carbon.....III., 291
Filter-Paper Free From Ash.....V., 60
Filtration with Bunsen Pump.....III., 222
Flour, Microscopic Tests.....III., 302
Fluorhydric Acid for Decomposition of Samarskite, etc......V., 276
Franklinite and Associated Minerals.....VIII., 148
Gallium from Zinc and Ferrous Oxide.....IV., 54
Gas-Analysis.....III., 16; IV., 322; X., 284
Graphite Determination in Minerals.....VI., 159
Hematine as Reagent in Alkalimetry.....V., 163
Hydrochloric Acid Determination.....X., 282
HYDROBROMIC Acid.....V., 60
Hydrogen Peroxide in Analysis.....X., 277
Hydrosulphuric Acid.....X., 376
INVERT-SUGAR by Alkaline Copper Solutions.....I., 11
Iodine in Blowpiping.....X., 322
Iron Assay Notes.....II., 173
and Steel, International Standards for.....X., 336
Iron Ores.....I., 81, 127
Colorimetric in Water.....X., 283

PAGE

ANALYTICAL CHEMISTRY.—*Continued.*

Influence of Copper on Determination in Alloys.....X., 279, 371
in HCl Solution by Permanganate Titration.....X., 371
in Minerals.....X., 370
Volumetric.....V., 165
KEROSENE, Testing.....I., 130
Kjeldahl Process for Nitrogen.....IX., 241; X., 378
Lead Analysis.....X., 373
Slags Analyses.....IX., 218
Sulphate from Silicic Acid.....III., 223
Volumetric.....X., 281
Lithia by Fluorides.....X., 278
LUNDBERG Case.....X., 193
Manganese in Spiegel.....VI., 24
in Slags.....V., 217
Methods.....VI., 35
Meldometer.....X., 379
Mercury, Ammonia Test.....X., 372
Electrolytic.....X., 375
Electrolytic from Copper.....X., 375
in Minerals.....X., 373
Volumetric.....V., 279
Metals, Separation of, by Electrolysis.....III., 302; V., 270
Minerals, Solution for Separating.....V., 165
Morphine in Opium.....VI., 375
Nickel-Matte Concentration.....V., 161
Nickel and Cobalt, Separation.....IV., 53; I., 184; VIII., 335; X., 277, 371
Impurities in Separation Reagents.....X., 277
Volumetric.....X., 372
Nickel and Zinc, Separation.....VI., 284; X., 279
Nitrates in Water.....X., 283
Nitric Acid in Nitrates.....III., 301
Nitric Nitrogen by Kjeldahl.....X., 378
Nitrogen Determinations.....III., 222
Kjeldahl Process for the Determination of.....IX., 240
NITROMOLYBDIC Acid, at Maximum Concentration.....V., 104
Nitroso β Naphthol in Quantitative Analysis.....X., 370
Nitrous Acid in Water.....X., 378
in Presence of Nitric.....X., 284
OILS and Fats, Hübl Method.....VI., 276
Opium, Morphine in.....VI., 375
OZONE Reactions.....IV., 174
Paraffin, Generation of H_2S with.....III., 301
Permanganate Standardizing.....X., 371
Peroxide of Hydrogen as a Reagent.....X., 277
New Reaction for Detecting.....VI., 283
PHENOL, Qualitative and Quantitative Tests.....II., 49
Phenol-Phthalein and Ammonia.....X., 370
Phosphates, Insoluble.....X., 376

PAGE

ANALYTICAL CHEMISTRY.—*Continued.*

Phospho-Molybdate Precipitate....X., 376
Phosphoric Acid, in Basic Slags....X., 282
Precipitation in Presence of Citrate....X., 283
Volumetric....IV., 51; X., 282
PHOSPHORUS, in Pig-Iron....X., 194
in Iron-Ores....X., 279
PIG-IRON Analyses....X., 195
PLASTER Tablets in Blowpiping....X., 320
Platinum, Roughness on....III., 301
Potash in Silicates....V., 59
Potassium Manganate in Analysis....X., 370
QUALITATIVE Analysis, Scheme....X., 255
by Electrolysis....X., 280
Tests, Comparative Delicacy....VIII., 366
Quantitative Electrolysis....X., 280, 374
Reduction of Ferric Iron....X., 278
Scheme for Qualitative Separation of Al, Cr, Fe, Etc....X., 255, 278
Selenium and Tellurium, Fractional Separation....V., 278
Silica, in Silver Lead Ores....VI., 161
Action of Hydrofluoric Acid on....VII., 384; VIII., 115
Silicate, Method for Analysis....V., 165
Silicon in Pig-Iron....X., 200, 371
in Ferro-Silicon....X., 279
Silver, in Lead....III., 301; IV., 54
Universal Flux for Assays....III., 51
SILVER Salts from Silicic Acid....III., 223
Slag....II., 145; V., 351; VI., 154
Soap Test for Hardness Water....X., 283
Soda from Iron, Alumina, Lime and Magnesia....V., 59
Soda-Compounds, Estimation....IV., 52
STEEL Analysis....III., 51, 290; V., 34
Substances Containing Lime, Alumina and Magnesia....X., 278
SUGAR Analysis....III., 52
SUGAR by Alkaline Copper Solutions....X., 11
SUGARS, Beet-Root, by Inversion-Process Applied to....VI., 257
Sulphur in Coal....X., 375
in Iron and Steel....VI., 285
in Manufactured Iron....X., 279
in Metallic Sulphides....II., 146
Influence Copper on Estimation....V., 74
in Lead....II., 211
in Pyrites....IV. 51; V., 164, 165
in Pig-Iron....X., 198
Volumetric....I., 166
Sulphuric Acid Volumetric....I., 166; VIII., 18
Tannin in Barks and Extracts....V., 278
Tellurium and Selenium, Fractional Separation....V., 278
Phenol or Carbolic Acid....II., 49

PAGE

ANALYTICAL CHEMISTRY.—*Continued.*
Tin and Antimony Separation.....IV., 54; X., 280
and Lead, Examination of Alloy.....X., 373
and Tungsten.....X., 281
and Mercury.....X., 373
Tin Test.....V., 165
Titanic Acid.....IV., 52
Titanium, Colorimetric by Peroxide of Hydrogen.....V., 58
in Iron Ores.....IV., 51; V., 160, IX., 279
in Silicates.....X., 278
TITRATION.....IV., 52
Alkalimetric.....X., 370
by Permanganate in HCl Solution.....X., 371
Modification Pemberton's Method.....X., 377
Tungsten in Alloys.....X., 373
WATER ANALYSIS.....V., 344, X. 283
Colorimetric for Iron.....X., 283
Colorimetrics for Nitrates.....X., 378
Kjeldahl Process.....X., 377
Nitrates.....X., 283
Nitrous Acid.....X., 378
Soap Test for Hardness.....X., 283
ZINC Determination.....III., 260, IV., 52
Electrolytic.....III., 301
from Manganese Group.....X., 279
Zirconium and Aluminium, Separation.....X., 276
ANDOVER Iron Company.....IV., 119
ANGLE Measurement.....VI., 43; VII., 38
ANTHRACITE Graphitic, at Parker Mine.....X., 313
Mining.....IV., 100
Mines. Handling of Coal.....IV., 100
ANTHRACITE FURNACES. Going into Blast.....VI., 358
ANTIMONY. See Analytical Chemistry.
APPALACHIAN Mines.....III., 208
APPLIED CHEMISTRY. See Industrial Chemistry.
Appraisement of Damages to Water-Powers.....X., 319
AQUEOUS Theory of Filling Fissure Veins.....I., 100
AQUEOUS Vapor, Thermal Effect on Feldspathic Rocks.....VI., 1
ARCHÆAN Areas of Northern New Jersey and Southern New York.....IX., 33
ARCHES, Relation of United Strain and Thrust.....VI., 209
ARCHITECTURE at the School of Mines.....III., 1; X., 29
ARIZONA Copper Production.....VI., 370
Arlberg Tunnel.....V., 154
AROMATIC Series, Isomerism in.....II., 201
ARRASTRA.....III., 91
Treatment of Gold.....VIII., 125
Treatment of Native Silver in Mexico.....I., 108
ARSENIC. See Analytical Chemistry.
ARTESIAN Borer in Prospecting.....X., 236

PAGE
ARTIFICIAL Diamonds....I., 140
ASCHMANN, F. T., Analyses of Coffee....I., 13
Stimulants and Narcotics....I., 74
Bethnal Green Museum....II., 71
ASPHALT Pavement....I., 137; X., 292, 294
ASSAY, *Mechanical, for Control of Coal Washing*....III., 218
of Cupriferous Blende....III., 223
Silver, Universal Flux for....III., 51
ASSAY Laboratory, Additions and Improvements in....V., 64; VI., 224
ASSAY Office, New York City. Parting Gold and Silver....VII., 1
ASSAYING Iron-Ores....II., 173
ASSAYING, New Course in....V., 174
ASTRONOMICAL Longitudes....VI., 39
Astronomy....V., 166, 173
Athabaska, the Steamer....V., 155
AUDUBON Monument....IX., 288
AURORA, Nevada, Past and Present....III., 133
AUSTEN, P. T., Relation of Aluminic and Ferric Salts to Plant Life....VI., 235
AUTOMATIC Air-Brake, Westinghouse....IX., 46
Coal Dump....IV., 106, 109
Devices for Sampling....III., 255
Jigs....IV., 204
Safety Gates....III., 215
AZIMUTH....VI., 41

B

BALANCE-ROPE as Counterbalance....X., 267
BALCH, S. W., Mechanics of the Friction Clutch....VI., 118
Method of Working Thick Deposits of Iron-Ore....IV., 98
BALLOONS and Flying-Machines....I., 110
BALL'S Stamp....III., 93
Banca Tin-Mines....VII., 99
BARKS; Tannin Estimation....V., 278
BARNARD, F. A. P.: Elective Studies....VIII., 20
Letter to Graduates....VIII., 164
Systems of Weight and Measure....IX., 193
The Metrological System of the Great Pyramid....V., 97, 193, 289
"BARNEY"....IV., 106
BARNUM Mine, Sinking of Shaft "A"....III., 115
"B"....III., 277
BAROMETER Note Book....VI., 51
BARUS, Carl, Kaolinization....VI., 1
Electrical and Magnetic Properties of the Iron Carburets....VII., 24
BARREL Amalgamation....III., 101
BARTLETT, F. R., Western Union Time System....X., 218
BASALT as Road Material....I., 36, 63
BASE Line....VI., 38
Lines, Apparatus for Measuring....IV., 231

PAGE

BASIC Bessemer Process.....II., 216; IV., 141; V., 269, 270
Bricks.....IV., 143
Open-Hearth Steel Process.....VII., 49
Pig.....IV., 142
Process at Creusot.....V., 54
BASINS, Lake, Excavated by Ice.....VI., 149
BATOPILAS, Native Silver-Ores and their Treatment.....IV., 63, VI., 57
BATTERY, New Form of Electric.....V., 58
BAYS Mountains, Tenn., Topography and Structure.....VIII., 242
BEACH Gold.....III., 85
Mining.....VII., 118
BEAUMÉ Degrees, Value of.....VI., 158
BEET Root Sugars, The Inversion Process Applied to.....VI., 257
BENZINE; Action of Sulphurous Anhydride on.....VIII., 253
Berg Nickel Mine, Senjen, Norway.....V., 266
Berlin Stadtbahn.....IV., 9
Bessemer Production of Chilling Irons.....II., 141; III., 53
Process, Improvements.....V., 157
Process, Basic Improvements.....V., 269
BESSEMERIZING Copper Mattes.....V., 162; VI., 320
BETHLEHEM Iron Company.....IV., 119
BETHNAL Green Museum.....II., 71
BIBLIOGRAPHY. See also Literature.
of Earthquakes.....VIII., 19
of Metal Iridium.....VI., 114
of Mining.....X., 176
BIGGART'S Method, Determination of Sugar.....X., 15
Birmingham Coal Industry.....IV., 225
BISMUTH. See Analytical Chemistry.
BLACK COPPER Furnace Vershire.....VII., 307
Fusion, Point Shirley.....VII., 377
Fusion Agordo.....IX., 272
Smelting.....VII., 307
BLANK Analyses, Causes of Error in.....IX., 81
BLAST-FURNACES, Blowing in.....VI., 358
Consumption of Fuel.....V., 161
Cure for Chill.....IV., 226
Engorgements.....III., 302
Sulphur Crystals on Slags.....VI., 280
The Martel.....IV., 126
Blasting-Gelatine, Nobel's.....III., 140, 296
Blasting-Pods.....III., 141
Blasting-Powder.....III., 50, 140
BLEACHING Chemical Fibre.....X., 171
BLISTER Furnace at Ducktown.....VII., 185
BLOCK Signals.....VIII., 54
BLOSSBURG Mine, Endless Rope-Hauling.....III., 182
BLOWPIPING. See Analytical Chemistry.
BLUE Hills, Copper Mines.....VII., 312

PAGE

Blue-Printing Process.....IV., 240
Blue-Prints, Large Frame for.....V., 49
BLUFF Formation.....X., 67
BOAT RACING, Inter-Collegiate.....VIII., 368
BOILERS. See Mechanical Engineering.
BOILING the Gold Residues in, U. S. Mint.....VII., 262
BOOK REVIEWS:
ABSOLUTE Measures in Electricity and Magnetism. By Andrew Gray, M.A.....V., 387
AMERICAN UNIVERSITY. When shall it be? Where shall it be? What shall it be. By John W. Burgess.....VI., 169
ANALYTICAL MECHANICS. By W. G. Peck.....IX., 96
APPLIED MECHANICS. By James H. Cotterill.....VI., 88
ART of Ore-Dressing in Europe. By W. B. Kunhardt.....VI., 89
CATALOGUE of Minerals. By Albert H. Chester.....VIII., 88
CLASS Book, Elementary Chemistry. By W. W. Fisher.....X., 191
CLASS Book of Geology. By Archibald Geikie.....VII., 388
COPPER-BEARING Rocks of Lake Superior. By R. D. Irving.....VI., 171
DAVIES Surveying. Revised by J. H. Van Amringe.....V., 63
ELEMENTARY Physics. By Balfour Stewart and H. Gee.....VIII., 383
ELEMENTARY Treatise on Determinants. By William G. Peck.....VIII., 288
EXAMPLES in Physics. By D. E. Jones.....X., 192
FRICTION and Lost Work in Machinery and Millwork. By Robert H. Thurston.....VII., 97
GRIMSHAW'S Pump Catechism.....X., 93
HEAT. By P. G. Tait.....V., 388
IMAGINARY Metrological System of the Great Pyramid of Gizeh. By F. A. P. Barnard.....VI., 90
INTRODUCTION to the Study of Organic Chemistry. By Adolph Pinner, V., 60
JAHRES-BERICHT über die Leistungen der Chemischen Technologie, 1884. By Dr. F. Fischer.....VII., 96
LESSONS in Elementary Physics. By Balfour Stewart.....VIII., 383
LIGHT. By P. G. Tait.....VI., 89
LIST of Tests (Reagents). By Hans M. Wilder.....VII., 192
LIXIVIATION of Silver Ores with Hyposulphite Solutions, with Special Reference to the Russell Process. By Carl A. Stetefeldt.....X., 95
MANUAL of American Colleges. By C. P. Karr.....IX., 386
MECHANICS of Materials. By Prof. Mansfield Merriam.....VII., 95
MECHANICS of Machinery. By Alexander B. W. Kennedy.....VIII., 382
METALLURGY of Silver, Gold, and Mercury in the United States. By Thomas Egleston.....IX., 95
MICROSCOPICAL Physiography of Rock-Making Minerals. By H. Rosenbusch. Translated by J. P. Iddings.....X., 191
MORE Convenient Equivalents for Converting British into Metrical Measures than Those now in Use. By G. J. Stoney.....V., 380
NATURAL System in Mineralogy with a Classification of Native Silicates. By T. Sterry Hunt.....VII., 387
NOTES on Electricity and Magnetism. By J. B. Murdock.....VI., 89
ORE-Dressing. By W. B. Kunhardt.....V., 388

PAGE

BOOK REVIEWS—*Continued.*
PHOTOGRAPHIC Mosaics for 1886. By Edward L. Wilson.....VII., 192
PRACTICAL Physics for Schools. By Stewart & Gee.....IX., 386
PRINCIPALS and Methods of Soil Analysis. By Edgar Richards.....VIII., 89
PYRAMID Metrology. By F. A. P. Barnard.....V., 388
PYRAMIDS and Temples of Gizeh. By W. M. Flinders-Petrie.....VI., 288
SECONDARY Enlargements of Mineral Fragments in Certain Rocks. By R. D. Irving and C. R. Van Hise.....VII., 98
SIXTH Annual Report of State Mineralogist of California.....VIII., 288
SQUARE Bar Micrometer. By S. C Chandler, Jr.....VII., 192
STORY of the Heavens. By R. S. Ball.....VII., 192
TEXT-BOOK of Popular Astronomy for the Use of Colleges, Academies, and High Schools. By W. G. Peck.....VI., 287
TEXT-BOOK on Principles of Physics. By Alfred Daniel.....V., 386
THEORY and Practice of Surveying. By J. B. Johnson.....VIII., 88
TOTTEN, LIEUT., on Mr. Petrie.....VI., 91
TRACK, A Complete Manual of Maintenance of Way. By W. B. Parsons, Jr.,.....VIII., 87
TREATISE on the Adjustment of Observations, with Applications to Geodetic Work and Other Measures of Precision. By T. W. Wright, VI., 287
TREATISE on Determinants. By W. G. Peck.....VIII., 288
(Revised Edition).....X., 93
Treatise on Ore-Deposits. By J. Arthur Phillips.....VI., 170
BOOKS on Mining.....X., 176
BORACIC Acid. See Analytical Chemistry.
Bore Holes Used as Rope, Steam and Water Ways.....IX., 189
Boring Machines, Rotary Hydraulic.....III., 139
Boston, Sewerage System.....IV., 227
BOWEN, H. C., An Apparatus for Determining the Relative Degree of Cohesion of a Semi-liquid Body.....X., 297
Kjeldahl Process for Determination of Nitrogen.....IX., 240
BRAKE, Carpenter Electro Air.....IX., 48
Eame's Automatic Electric Vacuum.....IX., 44, 45
Westinghouse Automatic.....IX., 46, 47
BRARD'S Method of Testing Building Stones.....I., 33
Bread-Baking Furnaces.....IV., 246
BREASTS, Coal.....IV., 101, 102
BREMEN Mines, N. M.....VI., 140
Brickwork, Expansion of Tie-Rods in.....III., 297
Strength of.....III., 299
Bridge, Berlin Railway.....IV., 12
The New Forth.....V., 265; VI., 165; VIII., 184
St. Lawrence.....VIII., 184
Specification Formulæ for Steel and Iron Columns.....IX., 80
Use of Town's Truss.....IX., 315
Bridge-Pins.....IX., 92
BRIDGE-STEEL, Notes on.....IX., 248
Bridge-Truss, Most Economical Height.....V., 51
BRITTON, N. L., Geology of Richmond County, New York.....II., 165

PAGE

BRITTON, N. L., Recent Field Work in the Archæan Areas of Northern New Jersey and Southeastern New York ..... IX., 33
BROMINE, Estimation ..... V., 278
Bronze, Manganese ..... V., 271
BROWN, W. L., Notes on the Analysis of Chrome Paints ..... VIII., 81
BROWNING, F. D., Gold Chlorination in California ..... V., 359
San Juan Mine ..... III., 264
BRUGMAN, W. F., Influence of Copper on the Estimation of Sulphur ..... VIII., 74
Steel Analysis ..... V., 34
BUDDLING of Iron-Deposits ..... III., 43
BUILDINGS, Fire Proof ..... V., 265
BUILDING Stones ..... I., 27, 53
BUILDING-STONE Surfaces ..... IV., 270
Crushing Tests ..... V., 266
BULLION Granulation ..... VII., 8, 257
Inquartation ..... VII., 8
Treatment ..... III., 164
BURETTE for Gas Analysis ..... IV., 322
Burlington Brake Tests ..... VIII., 376; IX., 43
BURNS, E. Z., Electrical Signaling in Mines ..... IX., 357
BUTLER, W. P., Some New Mining Cases ..... VII., 197
The Right of Lateral Pursuit ..... VII., 357
The Durant-Emma Case ..... VIII., 235
Appraisement of Damages to Water Powers ..... IX., 319

C

Cable Roads ..... IV., 146
Cadmium Iodide, Allotropic Forms ..... V., 61
Estimation ..... IV., 53
CÆN Stone, Strength of ..... I., 37
CAFFEINE, Amount Contained in Coffee ..... I., 13
CAGES with Safety Clutches ..... III., 243
Cahawba Coal-Field ..... IV., 225
CAISSON in Shaft "B," Barnum Mine ..... III., 281
CAISSONS for Subaqueous Tunnelling ..... IV., 97
CALCINATION ..... VI., 325
CALCULATION of Charge for Lead Furnaces ..... IX., 373
CALIFORNIA and Nevada Dry Lakes ..... X., 316
Gold Chlorination in ..... V., 359
Parting Gold and Silver ..... I., 43
Quicksilver Deposits ..... IV., 294
Stamp ..... III., 93
CANALS, Steam on the ..... II., 127, 182
Cantilever Bridges ..... VIII., 379
Bridge, Prof. Trowbridge's Connection with ..... V., 264
CAPLETON Copper-Mines ..... VII., 313
Carbo-Hydrate from Cast-Iron ..... IV., 239
CARBOLIC Acid, Qualitative and Quantitative Tests ..... II., 49

PAGE

CARBON. See Analytical Chemistry and Chemistry.
CARBONATE Mine, Ore-Concentration at.....III., 127; IV., 3
CARBONATES of the Coal-Measures.....II., 14
Carbonic. See Chemistry.
CARPENTER Continuous Automatic Air-Brake.....V., 132
Electro Air-Brake.....IX., 48
Car Wheels, Life of.....V., 267
CARS for Endless-Rope Haulage.....III., 193
Used at Drifton, Pa.....IV., 103
Carson Excavator.....IV., 228
CASTING and Founding.....II., 85
Ingot, New Method.....V., 273
Silver and Gold.....VII., 271
Casting-Pit Improvements.....V., 273
Castings, Iron, Irregularities and Roughness.....X., 160
Dense Metal.....V., 272
Caustic Alkali. See Analytical Chemistry.
CAUSTICIZING in Manufactured Chemical Fibre.....X., 169
CELLARS, Ventilation of.....III., 24
CEMENT of Blast-Furnace Slag.....IV., 238
as Lining for Mine Gangways.....III., 292
Under Pressure for Grouting.....III., 298
CEMENTS, Cohesion of.....X., 297
CENSUS, Tabulation by Electric System.....X., 238
CENTENNIAL, The Columbia College.....VIII., 257
Ceylon, Cost of Labor in.....VIII., 184
CHAINS, Use and Care of.....IX., 94
CHAMBER Working, Republic Mine.....III., 112
Deposits in Limestone.....I., 93
CHAMPION Iron Mine.....III., 93, 112, 184, 197, 250, 257
CHARGE for Lead Furnaces. Calculation.....IX., 373
CHARLESTON Earthquake, Line of Origin.....VIII., 64
CHEEVER Shaft, Tilly Foster Mine.....VI., 289
Mass., Iron Mine.....IV., 98
CHEMISTRY. See also Analytical Chemistry, Assaying, and Industrial Chemistry.
ACID Hydrobromic.....V., 60
ALUMINIC Salts and Plant Life.....VI., 235
Arsenic Pentasulphide.....X., 372
BENZINE; Action of Sulphurous Anhydride on.....VIII., 253
Cadmium Iodide, Allotropic.....V., 61
CAFFEINE, in Coffee.....I., 13, 14
CARBON Quantivalence.....II., 201
Carbonic Acid, Action on Iron.....IV., 227
Oxide Gas, Poisoning.....II., 140
CHEMICAL Agencies in the Filling of Fissure Veins.....I., 101
Society.....V., 176, 280, 381
Action of Light.....II., 42
CHLORIDES in Rainfall of 1884.....VI., 335

PAGE

CHEMISTRY—*Continued.*
Coal and Cannel Gas Composition.....VI., 167
Copper-Peroxide.....VI., 286
Copper-Sulphide, in Colloidal Condition.....V., 58
DIAMONDS, Artificial.....I., 140
Elements, New.....X., 379
FERRIC Salts and Plant Life.....VI., 235
Flour-Dust, Explosion, in St. Louis.....IV., 149
GASES Contained in Steel.....V., 224
GOLD Solubility.....III., 7
Distribution.....III., 6
Genesis.....III., 6
HYDROFLUORIC Acid on Silica and Silicates, Action of.....V., 115; VII., 384
IRIDIUM.....VI., 97
Bibliography.....VI., 114
IRON, Genesis of.....II., 1
and Nickel, Crystalline Subsulphide.....IX., 93
Carburets, Electric and Magnetic Properties.....VII., 24
Effect of Phosphorus and Silicon.....I., 45
High in Titanium.....V., 160
Iron Pipes, Action on Water.....X., 284
ISOMERISM in Aromatic Series.....II., 201
LEAD and its Alloys, Action of Hot Concentrated Sulphuric Acid.....II., 177
Action of Cold Concentrated Sulphuric Acid.....II., 97
LIGHT, Chemical Action.....II., 42
Manganese Effect, on Steel.....II., 139
Mercury Iodide, Solubility.....VI., 286
Microscopic Organisms, Destruction.....III., 301
NITROGLYCERINE, Boiling.....III., 250
NITROSACCHAROSE.....IV., 17
OPIUM, Hashish, Etc.....I., 79
Organic.....V., 60
Oxygen, Nitrogen and Carbonic Oxide Liquified.....VIII., 174
Paraffins, New.....VI., 375
Peroxide of Copper.....VI., 286
PLATINATES, Compound.....I., 64
Scandium, New Metal.....I., 85
STUDY of Chemistry in Germany.....V., 1
Sulphur Crystals on Blast Furnace Cinder.....VI., 281
TEA, Coffee, Cocoa, and Substitutes.....I., 87
TOBACCO as a Stimulant and Narcotic.....I., 78
Vanadium in Ceylon.....IV., 239
Writing Equations.....V., 235
Ytterbia, Spectrum.....I., 42
Zinc and Iron, Expansions.....IV., 231
CHILIAN Mill.....III., 92
Chilling Properties of Iron.....II., 140
CHILLING-IRONS, Production of.....III., 53

PAGE

CHIMNEYS *versus* Fans.....VII., 347
Chlorine. See Analytical Chemistry.
CHLORINATION, in California Gold.....V., 359
Chloro-Bromide of Lead.....II., 211
CHLOROFORM, Chloral and Ether, as Stimulants and Narcotics.....I., 79
CHROME Paints, Analysis of.....VIII., 81
Steel, New Method of Making.....V., 270
Chromic Acid and Chromium. See Analytical Chemistry.
CHRONOLOGY of the Human Period.....X., 318
CHUTES for Coal.....IV., 101, 102, 103
for Sand.....VI., 298
in Iron Veins.....IV., 114, 115, 118
CICADA, Uneducated Reason in.....VII., 152
CINNABAR Deposits of California.....IV., 294
CITY Houses, Sanitary Condition.....III., 21
Surveying.....IV., 138
CIVIL Engineer, and Mechanical Engineering.....I., 148
CLARK, E. P., Mining Law.....V., 242
CLARK, F. S., Distillation of Pine Wood in the South.....IX., 162
CLARKE, H. G., Aurora Nevada—A Little of its History, Past and Present, III., 133
CLASSICS and Natural Science at a German Gymnasium.....VII., 326
Classification. See Ore-Dressing.
CLAYS of Richmond County, New York.....II., 167
Cleaning. See Ore-Dressing.
Cleveland Iron Mine.....III., 106, 197, 246, 249
CLEVELAND Mine, Treatment of Copper Ore at.....IV., 224
CLINTON Ores.....II., 13
CLUTCH. The Mechanics of the Friction.....VI., 118
COAL :
Alabama.....IV., 225
Basin, Colorado.....IX., 335
Birmingham Industry.....IV., 225
Bituminous of Pennsylvania.....III., 49
Breasts.....IV., 101
Buggy Roads and Supports.....IV., 101
Cahawba.....IV., 225
Chutes.....IV., 101
Cleaning by Air-Blast.....IV., 59
Colorado.....IX., 327
Crested Butte, Colorado.....IX., 332
Glenwood Springs, Colorado.....IX., 337
Great Falls, Montana.....VIII., 327
Gunnison Mountain, Colorado.....IX., 333
Handling in Anthracite Mines of Pennsylvania.....IV., 100
Locomotives.....IV., 104
Machine Mining in the St. Louis Regions.....IX., 290
Pennsylvania Available Bituminous.....III., 49
Physical Conditions of Formation.....IV., 169
Pillars.....IV., 101

PAGE

COAL—*Continued.*
Piñon Basin, Colorado....IX., 338
South Staffordshire....VII., 235
Spontaneous Combustion of....VII., 250
Sulphur in....X., 375
Transportation on the Ohio and Mississippi....III., 294
Washing, Mech. Assays for Control of....III., 218
Western Laramie belt....IX., 330
White River County Colorado....IX., 340
Coal-Gas Composition, etc....IV., 239; VI., 167
Gas, a New Residual Product from....V., 277
COAL Mines, Underground Haulage in the Pennsylvania....II., 194
Cobalt. See Analytical Chemistry.
Cobalt and Manganese, Extraction from Their Ores....V., 161, 162
COBBING Ores....IV., 195
COCOA, Coffee, Tea, and Substitutes as Stimulants and Narcotics....I., 78
COHESION of a Semi-Liquid Body....X., 297
COINS, of United States, Weight, Fineness, Size, etc....VII., 278
Coke Ovens, Improvements in....V., 272
COLBY, A. L., Analyses of Coffee....I., 13
Paper Hanging....II., 27
Soap....I., 119
COLBY, C. E., On the Action of Sulphurous Anhydride on Benzine....VIII., 253
COLLEGES of United States, Financial Condition....II., 147
COLLISIONS of Trains....VIII., 55
COLOR Contrast....VIII., 307
COLORADO Coal-Fields....IX., 327
Minerals....III., 142
Oil-Fields....X., 97
Ore Sampling in....III., 254
Surveying Mining Claims....II., 116
Colorimetric Determination of Iron in Waters....X., 283
for Nitrates in Water....X., 370
COLUMBIA College Centennial....VIII., 257
Electrical Engineering at....X., 172
Historical Sketch....VIII., 258
Titles of Faculties and Schools of....V., 79
Column Formulæ....IX., 88
Columns, Strength of Iron....IV., 233
COMBINATION Track, Turnouts....VII., 131
COMBINED System *versus* Separate System in Sewerage....X., 207
Combustion. See Analytical Chemistry.
COMMINUTION of Ores with Stamps....IV., 301
COMPARISON of Cost of Power in Exhaust and Plenum Ventilation....VI., 82
of the Delicacy of Certain Qualitative Tests....VIII., 366
Compass, Self-Registering Ship....V., 155
COMPASS-READING, to Minutes....III., 29
COMPENSATION for Railroad Curves....VI., 166
Composition of Coal and Cannel Gas in Relation to Illuminating Power....VI., 167

PAGE

Compressed-Air Mine Locomotives.....II., 215
CONCENTRATED Rolling Loads.....VIII., 317
CONCENTRATING Nickel Mattes.....V., 161
CONCENTRATION of Ores.....IV., 1
of Gold and Silver-Ore on the Pacific Coast.....VIII., 336
of Iron-Deposits.....III., 43
of Iron-Ore.....IX., 147
of Patio Tailings in Mexico.....I., 110
of Slimes.....IV., 313
of Tailings at San Juan Mine.....III., 268
CONCRETE Mixer.....VI., 308
CONDENSATION Chambers.....III., 160
of Acid Fumes.....VII., 14
CONGDON, E. A., The Manufacture of Chemical Fibre.....X., 163
CONTACT Deposits.....I., 91
CONTRACT Work in Marquette Mines.....III., 247
CONSTRUCTION. See also Bridges, Building Stones, Strength, Trusses, Tunneling.
CONCENTRATED Rolling Loads.....VIII., 317
Formulæ for Safety Valves.....VI., 282
Forth Bridge.....V., 265; VI., 165; VIII., 184
FOUNDATIONS.....I., 37, 53
HIGH-Bridge.....X., 61
Iron Rods for Roof-Laths.....IV., 58
LATERAL Pressure of Sand.....IX., 109
Masonry Piers of Croton Lake Bridge.....V., 52
MIDDLE Third Theory for Stone Arches.....VI., 209
RITTER'S Method of Moments.....IV., 86
Rivets, Working Stress.....VIII., 185
Steel Structural, Shop-Treatment.....IV., 228
STEEL and Iron Column Formulæ.....IV., 234; IX., 80
Stone Bridges vs. *Iron*.....VIII., 186
Substitution of Steel for Iron.....V., 157, 158
THRUST and Strain in Arches.....VI., 209
Tie-Rods, Expansion in Brickwork.....III., 297
Underpinning of Quay Wall at Gosport Navy Yard.....V., 52
Convenient Devise in Levelling.....VIII., 286
COOPER, W. H., Casting and Founding.....II., 85
Copper, Black, Fusion for.....VII., 307, 377
Copper Determination, Cuprous in Presence Cupric.....IV., 53
Electrolytic.....X., 374
Impurities in.....IV., 53
Volumetric.....II., 23
COPPER METALLURGY:
ALLEGHANIES, the Pyrites Deposits of.....VII., 154, 218, 301
ARIZONA Production.....VI., 370
BESSEMERIZING Mattes.....V., 162; VI., 320
ENARGITE, Treatment of.....IV., 5
Furnaces, at Ducktown.....VII., 183
Herreshoffs.....VII., 318, 320

PAGE

COPPER METALLURGY—*Continued.*
Furnaces at Orford....VII., 314
at Vershire....VII., 307
SMELTING at Agordo....IX., 124, 256
at Ducktown, Tenn....VII., 174
at Jalisco, Mexico....IV., 122
at Luzon Islaad....IV., 6
at Point Shirley....VII., 360
at Vershire, Vt....VII., 301
Copper, Influence on the Estimation of Sulphur....V., 74
Copper, Influence on Determination of Iron in Ferrō Alloys....X., 371
Copper-Mattes, Bessemerizing....V., 162; VI., 320
Copper-Mines, Blue Hills, Me....VII., 312
Capleton, Canada....VII., 313
Coxheath, N. S....VII., 312
Davis, Mass....VII., 310
Milan, N. H....VII., 311
Newfoundland....VII., 312
Vershire, Vt....VII., 301
Copper-Peroxide....VI., 286
Copper Production in Arizona....VI., 370
Copper Reactions for Salts....X., 373
Copper-Sulphate Treatment at N. Y. Assay Office....VII., 18
Copper-Sulphide, in a Colloidal Condition....V., 58
CORLISS Engine, Indicator Card....X., 274
CORNISH Pumps in Marquette Mines....III., 246
Stamp....III., 93
CORNWALL, H. B., Water Analysis....V., 344
the Uses of "Bismuth Flux,"....I., 126
COSGRIFF Shaft, Tilly Foster Mine....VI., 293
Cost of Labor in Ceylon....VIII., 184
of Power in Exhaust, and Plenum Ventilation....VI., 82
COUDERT, F. R., Oration at Columbia College Centennial....VIII., 261
COULOMB'S Theory of Lateral Pressure of Sand Against Retaining Walls...IX., 109
COUNTER BALANCING....X., 260
COUNTERPOISE System of Hoisting....X., 262
COXE, ECKLEY B., Practical Management of Public Works....VI., 251
Definition of "The Engineer"....IX., 346
COXHEATH Copper Mines....VII., 312
CRADLE....III., 82
CRANES....V., 127
Creosote for Timber....IV., 232
CRESTED Butte Coal District....IX., 332
Crucible Method for Lead, New....IV., 50
Crucible Steel Process, Theory of....V., 160
CRUDE Products from Distillation of Pinewood....IX., 177
Crushing Cold Quartz....III., 91
Machines, Comparison of....IV., 309
New Forms of Apparatus....IV., 306

PAGE

Crushing, Sizes Produced in....IV., 310
Cryolite in the United States....VI., 284
CRYSTALLINE Iron-Ore of Utah....II., 9
Sulphide of Iron and Nickel....IX., 93
Structure of Iron Meteorites....VIII., 90
CRYSTALLIZATION of Iron Sulphate at Agordo....IX., 264
Cuprous Oxide in Metallic Copper....X., 281
Curves, Resistance to Motion....III., 221
Cut-off on Ferry-Boat Baltimore....IV., 43

D

Daft Electro-Motor....V., 163
Dams. See Hydraulics.
DAVIS, J. WOODBRIDGE, Chronology of the Human Period....X., 318
Inaccessible Distances....III., 25
Davis Mine....VII., 310
DEBRIS of Furnaces, Sweepings, etc, Treatment of....VII., 22
DECOMPOSITION and Analysis of Slags....II., 145; V., 351
Decrepitation to Separate Heavy Spar and Gray Copper....III., 55
DEEP Placers....III, 87
Delicacy of Some Qualitative Tests....VIII., 366
Deposition of Ores....V., 329
DETERMINATION of Cohesion of a Semi-Liquid Body....X., 297
of Minerals....VI., 339
DEVEREUX, W. B., Native Process of Copper-Smelting in Mexico....IV., 122
Device in Levelling....VIII., 286
DIABASE Pavement....X., 293
DIAGRAMS Illustrating Rainfall and Flow of Streams....IX., 227
DIAMONDS, Artificial....I., 140
Genesis of....VIII., 188
Diamond Drill Used for Stoping....II., 142
DICKERSON Iron Mine....IV, 120
Dike Rocks....IX., 372
DINGEY Pulverizer....IV., 306
DIRECT Acting Pumping Engines....I., 173
DISCHARGE from Stamp....IV., 303
Disinfection Instructions....IV., 48
DISINTEGRATOR, Vapart Centrifugal....III., 55
Distillation of Naphtha in Steam....VI., 375
of Wood in the North....IX., 190
of Pine Wood in the South....IX., 162
DISTILLING Apparatus for Pine Wood....IX., 167
DISTRIBUTION of Gold....III., 6
DITCHES for Hydraulic Mining, Size and Cost....III., 88
Dithio-Carbaminate as a Reagent....X., 276
DOCKS of New York....II., 78
DOCTORS at Marquette Mines....III., 251
Dolomite Lining for Bessemer Converter....IV., 143

PAGE

DRAINAGE of City Houses.....III., 22; IV., 47
of Marquette Mines.....III., 246
of Mines.....IV., 243
of New Brighton, Staten Island.....X., 202, 302
Dredging, a New Method.....I., 85
Dressing. See Ore Dressing.
DRIFT Deposits.....VI., 147
DRIFT-MINING.....VIII., 248, 289
DRIFTING at L. S. Hematite Mine.....III., 117
Quick Work in.....IV., 56
DRILLING and Blasting in Marquette Iron-Region.....III., 196
Comparison of Hand and Machine.....III., 115
DRILLS, Compressed Air.....IV., 121
DRIVING Wheel for Endless-Rope Haulage.....III., 189
DRUMS, Hoisting.....III., 244
DRY Concentration of Ores.....IV., 1
at Przibram.....IV., 193
at Frisco, Utah.....III., 127
DRY LAKES of Southern Nevada and California.....X., 316
Dry Stamping.....III., 158
DRYING Cylinder at Frisco.....III., 128
Precipitates, Apparatus for.....IV., 50
DUCKTOWN, Roasting Ore at.....VII., 171
Smelting Works.....VII., 175
Dump Heaps, Building on.....IV., 237
DUNHAM, E. K., Projected Intersections.....I., 155
DURANT-EMMA Case.....VIII., 235
DUST Chambers.....IV., 245; V., 162
DUTY of Pumps.....I., 181
DYKE at Marshfield, Mass.....III., 119
DYNAGRAPHOMETER.....I., 70
DYNAMIC and Electrical Units.....IX., 341
Dynamite, New Form.....IV., 239
DYNAMOMETER, Kent's Improved.....I., 83

E

EAMES'S Automatic Vacuum Brakes.....IX., 44, 45
EARTHENWARE House Drains.....III., 23
EARTHQUAKES as Measurers of the Thickness of the Earth's Crust.....VIII., 12
Bibliography.....VIII., 19
Line of Origin of the Charleston.....VIII., 64
Periodicity.....VIII., 18
Proximate Causes.....VIII., 17
ECLIPSE, Partial Solar, of March 16th.....VI., 261
ECONOMIC Geology of Richmond County, New York.....II., 172
Economy by Sub-divison in Engine and Boiler Plants.....V., 268
Edwards Mine.....III., 44

PAGE

EFFECTS of Heat Upon the Strength of Iron....IX., 92
EFFUSIVE Rocks....X., 43
EGLESTON, T. Basic Open-Hearth Steel Process....VII., 49
Bessemerizing Copper Mattes....VI., 320
Drift-Mining....VIII., 204, 289
Extraction of Copper at Agordo....IX., 124, 256
Gases Contained in Steel....V., 224
Going into Blast....VI, 358
Haswell and Whitworths Steel Forgings....VI., 216
Mendheim Continuous Gas-Furnace for Fire-Brick and Porcelain....VIII., 34
Parting Gold and Silver in California....I., 43
Parting of Gold and Silver by Means of Iron at Lautenthal....VI., 240
Parting Process Used in the United States Mint at Philadelphia....VII., 253
Parting Gold and Silver in the United States Assay Office, New York, VII., 1
Point Shirley Copper Works....VII., 360
Progress of Metallurgy of Gold and Silver in the United States....III., 71, 157
Treatment of Enargite....IV., 5
Treatment of Gold in the Arrastra....VIII., 125
Working Placer Deposits in the United States....VII., 101
Elastic, Limit in Columns....IV., 235
ELECTIVE Studies....VIII., 20
ELECTRIC Air-Brake, Carpenter....IX., 48
Westinghouse Automatic....IX., 47
Electric Battery, New Form....V., 58
Conductors, Underground....V., 273
Light in Triangulation....I., 129
Railway....III., 141
Signaling in Mines....IX., 357
Tabulating System....X., 238
Vacuum Brake, Eames's....IX., 45
ELECTRICAL and Dynamic Units, Relation of....IX, 341
and Magnetic Properties of the Iron Carburets....VII., 24
Engineering at Columbia College....IX., 69; X., 172
Electricity....V., 163, 273
and Magnetism....V., 387
Applied to Analysis....III., 302
Transformation into Mechanical Energy....X., 123
Electrolysis, Quantitative....X., 280, 374
Electrolytic Assay of Copper-Ores, etc....X., 374
Conductivity....X., 284
Deposition of Cobalt....X., 284
Detection of Mercury....X., 375
Separation of Mercury from Copper....X., 375
ELECTRO-MOTOR, Daft....V., 163
Simple Form of....X., 124
Electroplating. See Industrial Chemistry.
ELEVATED Road; The Field-Work of a Survey for....X., 84
ELLIOTT, A. H., Apparatus for the Rapid Analysis of Mixtures of Gases....III., 16
Gas Analysis....IV., 322

PAGE

ELLIOTT, A. H., Nitroglycerine ..... IV., 15
Nitrosaccharose ..... IV., 17
Volumetric Determination of Copper ..... II., 23
Volumetric Determination of Sulphur and Sulphuric Acid ..... I., 166
ELY Copper Mine, Vermont ..... IV., 219
EMS, Treatment of Slimes at ..... IV., 320
Enargite Treatment ..... IV., 5
Endless-Chain Incline ..... III., 142
Endless-Rope Haulage at Blossburg Mine ..... III., 182
Hoisting ..... III., 216
Railroads, San Francisco ..... I., 187
ENERGY, Distribution in Electrical Circuit ..... X., 128
ENGEL, L. G., Masonry Supports for the Hanging Walls at the Tilly Foster Mine ..... VI., 280
ENGINEER, Definition of ..... IX., 346
Engines and Boiler Plants, Sub-division of ..... V., 268
Bisulphide of Carbon ..... VII., 210
Direct Acting Pumping ..... I., 173
Marine, Device for Getting off Centre ..... V., 154
ENGINEERING, Mechanical, and the Civil Engineer ..... I., 148
ENGINEERING. See also Bridges, Building, Stones, Construction, Hydraulics, Mechanical Engineering, Mining Engineering, Ore-Dressing, Railroads, Roads, Sanitary Engineering, Strains, Strength, Surveying, Trusses, Tunnelling.
Advice to Young Engineers ..... IX., 381
ÆROSTATION ..... I., 110
AIR-LOCKS ..... IV., 94
Cantilever Bridges ..... V., 264; VIII., 379
Carson Excavator ..... IV., 228
CEMENT of Blast-Furnace Slag ..... IV., 238
CEMENTS, Cohesion ..... X., 297
Creosote for Timber ..... IV., 232
DOCKS of New York ..... II., 78
Fire-Proof Buildings ..... V., 265
Flood Rock Explosion ..... VII., 193
Grouting with Hydrostatic Pressure ..... III., 298
Hydrostatic Pressure, Tests by ..... VI., 167
INCLINED Planes of Morris Canal ..... III., 283
MIXER for Concrete ..... VI., 308
MŒRIS and its Island Pyramids ..... VI., 71; VI., 130
PLANIMETER ..... I., 169; VI., 347
Seasoning of Lumber ..... IX., 94
STEAM on the Canals ..... II., 127, 182
THEORIES of the Lateral Pressure of Sand Against Retaining-Walls, IX., 109, 286
Timber, Preservation ..... IV., 232
Rails as Substitute for ..... IV., 242
TORSION Tests ..... IX., 29
Watertown Arsenal Testing Machine ..... IV., 233
WOODS, Flint's Investigation of the Nicaraguan ..... IX., 6
Strength of Americau ..... IV., 229

PAGE

ENGLISH System of Discharging Concentrates.....IV., 207
Engorgements in Blast-Furnaces.....III., 302
EQUATIONS, Chemical, Writing.....V., 235
Equatorial of Paris Observatory.....V., 166
EQUIVALENTS, Metrical.....V., 380
ERB, W. H., The Transformation of Electricity into Mechanical Energy.....X., 123
ERODING Power of Ice.....VI., 142
ERUPTIVE Masses as Ore-Deposits.....I., 90
ETHER, as Stimulant and Narcotic.....I., 79
EUREKA Silver District, Survey of.....IV., 294
EUROPE, The Present Aspect of Ore-Dressing.....IV., 179, 298; V., 8, 140
EXCAVATION of Lake Basins.....VI., 149
Excavator, The Carson.....IV., 228
Excrescences and Irregularities in Castings.....X., 160
EXHAUST *versus* Plenum Ventilation.....VI., 82
Extraction of Copper at Agordo.....IX., 256
EXPLOITING in Georgia.....III., 213
Explosives, New.....IV., 239
Underground Storage of.....IV., 56
Used in Marquette Mines.....III., 198
Explosion of Flood Rock.....VII., 193
Explosions, Boiler, Another Possible Cause.....V., 155
EXPLOSION Burette, for Gas Analysis.....IV., 322

F

FAHLBAND Ore-Deposit.....I., 92
FALSE Pseudomorphs of Quartz.....VII., 334
FANNIN County, Ga., Pyrite Mine.....VII., 223
FANS *versus* Heated Chimneys in Ventilation.....VII., 347
versus *Blowing Engines*.....IV., 237
Fats and Oils, Examination of.....VI., 285
Hübl Method for Testing.....VI., 276
Fatty Acids in Soup, Burette for Estimation.....V., 277
FAULTS, or Throws.....VI., 115, 119
Feeding Apparatus for Tables.....III., 297
of Stamps.....IV., 301
of Trommels.....IV., 191
FEHLING'S Method, Determination of Sugar.....X., 14
FERRER, CARLOS F., Signal Tripods of New York State Survey.....IV., 277
Ferric Iron, Rapid Reduction.....X., 278
FERRIC Salts and Plant Life.....VI., 235
Ferro-Silicon, Silicon in.....X., 279
the Use of.....IV., 144
Ferruginous Schists and Iron-Ores of the Lake Superior Region.....VIII., 188
Field Application for Equation of Curvature.....V., 53
Field-Notes of Mineral Survey.....II., 124
Field-Work in the Archæan Areas of New Jersey and New York.....IX., 33
of Survey for Elevated Road Over a Crowded Thoroughfare.....X., 84
Topographical.....VI., 45

PAGE

FILLING in of Chambers.....III., 113
Filter and Filtration. See Analytical Chemistry.
Financial Condition of Leading Colleges of United States.....II., 147
FINING and Refining at Agordo.....IX., 270
at Point Shirley.....VII., 381
FIRE-BRICK and Terra-Cotta Manufacture.....I., 16
and Porcelain, Mendheim Gas-Furnace for Burning.....VIII., 35
Fireclays and Rocks of Golden, Col.....II., 212
Fire-Proof Buildings, Developments in.....V., 265
FISSURE Veins,.....I., 96
Gold in.....III., 13
Theories of the Filling of.....I., 99
FLEXIBILITY of the Earth's Crust.....VIII., 14
FLINT'S Investigation of the Nicaraguan Woods.....IX., 6
FLOAT and Rusty Gold.....III., 75
"FLOAT" Mineral, Losses by.....IV., 314
Flood Rock Explosion.....VII., 193
Flour, Microscopic Tests of.....III., 302
Flour-Dust, Explosion, in St. Louis.....IV., 149
FLOW of Streams, Diagrams Illustrating.....IX., 227
at the Upper Waters of the Mississippi.....X., 72
Flow of Water in Pipes.....III., 299
Flue-Dust at Ems.....IV., 245
Flue System, in Distillation of Pine Wood.....IX., 168
FLUX, Calculations for Iron Assays.....II., 173
Pulp Mill Waste as.....IV., 141
FLYING Machines.....I., 110
FONTAINEBLEAU Sandstone as Pavement.....X., 290
FORD Mine.....IV., 113
FOREPOLING in Shaft "B," Barnum Mine.....III., 280
FOREST, Our Deepest.....VIII., 152
Forest of Dean Iron Mine.....IV., 118
FORGING, Heat Developed in.....V., 271
Formulæ for Iron Columns.....IV., 234
for Safety Valves.....VI., 282
Forth Bridge.....V., 265; VI., 165; VIII., 184
FOSSIL Ore of Clinton Group.....II., 13
FOUNDATIONS, Weight Supported per Square Foot.....I., 37, 53
FOUNDING.....II., 85
FOUNDRY Irons, Chemical Qualities of.....X., 147
FOX River, Improvement.....IV., 30
Fractional Distillation of Naphtha with Steam.....VI., 375
FRAME for Large Blue-Prints.....V., 49
FRESHETS, Effect on Structure of Iron-Deposits.....III., 45
FRICTION-Clutch, Mechanics of.....VI., 118
Friction Gearing.....III., 245
FRIEDBURG, L., What is the Cause of Isomerism in the Aromatic Series?.....II., 201
FRISCO, Utah, Dry Concentration at.....III., 127
FROGS and Switches.....V., 38

PAGE

FROST, Testing Effect on Building Stones....I., 33
Fuel. See also Coal.
FUEL, Consumption in Blast-Furnace....V., 161
Patent....IV., 240
Petroleum as Fuel....V., 156; X., 357
for Blast Furnace Chills....IV., 226
"FUEL-OIL" for Stationary Boilers in New York City....X., 350
FURMAN H. VAN F., Dry Concentration at Frisco, Utah....III., 127
Notes on Two Ore-Deposits of New Mexico....VI., 138
Underground Haulage in Pennsylvania Coal Mines....II., 194
FURNACE, Anthracite, Going into Blast....VI., 358
Breadbaking....IV., 246
Martel Blast....IV., 126
Shaft versus *Reverberatory, for Copper*....IV., 134
Siemens....V., 378
Smelting....IV., 133
Use of Petroleum in....IV., 227
Vershire....VII., 304, 307
Water-Jacketed....IV., 126
FUSION for Black Copper at Agordo....IX., 272
for Mattes at Agordo....IX., 266
for Mattes, Point Shirley....VII., 366
of Iridium....VI., 97

G

Gallium. See Analytical Chemistry.
Gangways, Cement Lining for....III., 292
in Coal Mines....IV., 100
Gas, Purification of....IV., 239
GASES Contained in Steel....V., 224
Gases. See Analytical Chemistry.
GAS-FURNACE, The Mendheim Continuous....VIII., 35
Gas-Pipes, Paper....V., 268
GASH Veins....I., 96
GEARING, Internal....III., 244
GEMS....II., 58
Genesis of the Diamond....VIII., 188
of Gold....III., 6
of Iron-Ores....II., 1
GEODESY....V., 173
GEODETIC Survey of Coast and Interior....IV., 290
and Topographical Surveying....VI., 37
GEOLOGY. See also Building Stones, Coal, Copper, Gold, Iron, Lead, Marble, Ore Deposits, Rocks, Silver.
ARCHÆAN Areas of New Jersey....IX., 33
DRY-LAKES of Nevada and California....X., 316
EARTH'S Crust, Flexibility....VIII., 14
EARTHQUAKES....VIII., 1
ERUPTION of Krakatoa in 1883....X., 132

PAGE

GEOLOGY—*Continued.*
EXCAVATION of Lake Basins....VI., 146
FAULTS, or Throws....IV., 115, 119
Fireclays and Rocks of Golden, Col....II., 212
Genesis of the Diamond....VIII., 188
of Petroleum....X., 101
GRAHAMITE in Colorado....VIII., 332
GRAPHITE, the Origin of....VIII., 334
GRAPHITIC Anthracite, Parker Mine, Idaho....X., 313
GREAT Basin, Survey....IV., 294
HURONIAN Ores of Lake Superior....II., 6
System at Upper Peninsula of Michigan....III., 36
Index to Current Literature of American....VIII., 172, 285, 375; IX., 85, 188
KAOLINIZATION....VI., 1
Kauri Gum of New Zealand....II., 214
KERSANTITE....VIII., 330
LAURENTIAN System at Upper Peninsula of Michigan....III., 35
LINE of Origin of the Charleston Earthquake....VIII., 64
LOESS, Origin of....X., 66
Relation to Dry Lakes of Nevada and California....X., 316
LURAY Caverns, The....VII., 148
MAP of MOUNT RANIER....VIII., 159
of the Geological Survey of the United States....IV., 296
MARQUETTE Iron Region....III., 35, 103, 197, 243
Notes....VIII., 327; X., 66
of Richmond County, New York....II., 165
Section of Shafts at Leadville....III., 292
"SHOOTS and Squeezes" in Iron Veins....IV., 114, 115, 118
Survey of United States....IV., 284
TOPOGRAPHY of Bays Mountains, Tenn....VIII., 242
Glacial....VI., 144
TRINIDAD Asphalt....X., 295
VOLCANOES....VIII., 12; X., 133
WESTERN Laramie Belt....IX., 330
GEORGETOWN Mine, N. M....VI., 138
GEORGIA, Mines of....III., 213
GERMAN Gymnasium, The Classics and Natural Science at....VII., 326
German Stamp....III., 93
GERMANY, The Study of Chemistry in....IV., 1
GEYER Concentrator for Slimes....IV., 321
Giant-Powder, for Removing Scaffolds in Blast-Furnaces....III., 302
GIZEH, Pyramid Hill of....VI., 193
GLACIAL Deposits, Survey of....IV., 295
Erosion, Mode of....VI., 152
Topography....VI., 144
GLENDON Iron Company....IV., 119
GLENWOOD Springs District....IX., 337
Glycerine Adulteration....IV., 239
GOING into Blast with Anthracite Furnaces....VI., 358

PAGE

GOLD:
BATTERIES, Stamp....IV., 30
Sluice....III., 94
BEACH Mining....III., 85; VII., 118
Casting....VII., 271
Chlorination in California....V., 359
CLEAN-UP at the North Bloomfield Gravel Mine....V., 373
Concentration of Patio Tailings in Mexico....I., 110
Cost of Production by Hydraulic Mining....III., 89
CRUSHING Gold Quartz....III., 91
DRIFT-MINING....VIII., 204, 289
"Float"....III., 75; IV., 314
Genesis and Distribution....III., 6
GRAVEL Mining....III., 210; V., 373; VII., 106
Hydraulic Mining....III., 90
in the Arrastra....VIII., 125
in Segregated Quartz Veins....I., 98
in Victoria Quartz Reefs, Origin of....V., 166
Losses of, in Plattner Chlorination Process....II., 140
METALLURGY of Gold and Silver, Progress of....III., 71, 157
NUGGETS, List of Large....III., 6, 72
Nuggets, Origin of....II., 139
Parting in California....I., 43
at Lautenthal....VI., 240
in New York....VII., 1
in Philadelphia....VII., 253
PLACER Deposits....I., 88; III., 5, 15, 79, 87; VII., 101
Placer Deposits in Yesso....III., 15
PLATTNER'S Process for Gold....III., 97
Progress of Metallurgy of....III., 71, 157
Purchases and Deposits of Bullion, Tables of....VII., 3
Purification, Melting and Casting....VI., 246
Quartz Treatment....III., 90
Refining at New York Assay Office....II., 18
RIFFLES in Sluices....III., 83
RIVER and Bar Mining....VII., 127
ROASTING Gold and Silver Ores....III., 158
SLUICE, Mining....VII., 110
Solubility of....III., 7
Table of Production Since 1848....III., 80
the Past and Future of....IX., 97, 101
the So-Called Rusty....II., 139
WET Placers, Working of....III., 79
Gold-Mills, Some Old....VIII., 61
Gold-Ores on the Pacific Coast, Concentration of....VIII., 336
Gold Residues, Boiling of, in Sulphuric Acid, United States Mint....VII., 262
Gold Platinum, and Tin, from Superficial Deposits....I., 88
GRADUATE News. See Alumni Association.
Granite. See Rocks.

PAGE

GRANULATION of Bullion....VII., 8, 257
GRAPHIC Computations, "Dynagraphometer"....I., 70
Graphic Tables for Stadia Measurements....VII., 323
GRAPHITE as Factor in Foundry Irons....X., 149
Determination in Minerals....VI., 159
the Origin of....VIII., 334
GRAPHITIC Anthracite, Parker Mine, Idaho....X., 313
GRATACAP, L. P., Chlorides in Rainfall of 1884....VI., 335
Ozone Reactions....IV., 174
GRAVEL Mining....III., 210; V., 373; VII., 106
Gravity Coal Piers at Hoboken....IV., 62
Roads in Coal Mines....IV., 105
GREAT Basin, Survey of....IV., 294
Great Telescopes of the World....VIII., 135
GREEK Tunnel of the 6th Century, B.C....VI., 264
GREENLEAF, JAMES L., Building Stones....I., 27, 52
Improvised Surveying Instruments....VII., 145
Measurement of Light Obstruction....VII., 35
Relation of Strain and Thrust in Arches....VI., 209
Ritter's Method of Moments....IV., 85
Rival Systems of Heating....V., 259
Grouting with Hydrostatic Pressure....III., 298
GUIDES in Shafts....IV., 242
"*Gunboat*"....IV., 106
Gunnison Mountain Coals....IX., 333

H

HALLOCK, A. P., a Combustion Crucible....V., 47
Chloral....I., 22
HAMMERS, Steam....II., 35
HANDLING of Coal in the Anthracite Mines of Pennsylvania....IV., 100
of Ores, Shaft Chamber....IV., 242
Ore at Marquette Mines....III., 200, 203
Handpicking Ores....IV., 193
Hanging Compass and Arc for Mine Surveying....V., 46
Hanging Walls of the Tilly Foster Mine, Masonry Supports for....VI., 289
HANNA, George B., Mines of the Appalachian Range....III., 208
Harbor Improvements at Galveston....II., 218
HARBOR Surveys....IV., 23
HARRISON Mining Machine....IX., 307
HASWELL and Whitworth's Steel Forgings....VI., 216
HATHAWAY, N., Modulus of Hydrometers....VI., 153
HAULAGE by Endless Rope....III., 182
in Prussian Mines....IV., 243
Underground in the Coal Mines of Pennsylvania....II., 194; IV., 103
Heat Conduction in Non-Conductors....VI., 166
Heat Developed by Forging....V., 271
Effect on Strength of Iron....IX., 92

PAGE

Heating, Rival Systems.....V., 259
Heating Surface Required in Ventilating Flues.....III., 171
HEBERLE Mill for Ore-Grinding.....IV., 307
Hematine as Reagent in Alkalimetry.....V., 163
HEMATITE, Mining of Large Deposits.....IV., 98
HENSOLDT, H., Methods of Modern Petrography.....X., 212
HERRESHOFF Furnace.....VII., 318, 320
HERZFELD'S Method, Determination of Sugar.....X., 21
HIBERNIA Iron Mines.....IV., 119
HIDDEN, W. E., False Pseudomorphs of Quartz.....VII., 334
Meteoric Iron from South Carolina.....VIII., 31
Recently-Discovered Meteoric Iron from Independence Co., Ark.,.....VII., 188
High Explosives, Use of Tamping with.....V., 266
HILDRETH, R. W., Concentrated Rolling Loads.....VIII., 317
Some Notes on Bridge Steel.....IX., 248
HILL, WILLIAM, Reclamation of Tide Land at Marshfield, Mass.....III., 118
HISTORICAL Sketch of Columbia College.....VIII., 258
Hoisting in Marquette Iron Mines.....III., 243
with Tapering Ropes.....X., 261
with Counter-Poise.....X., 262
with Endless Rope.....III., 216
with Loaded Wagon.....X., 262
by Koepe System.....X., 270
by Balance-Rope.....X., 267
on Inclined Plane. by Water Power.....VI., 283
with Turbine Wheels.....III., 245
Winding Engines.....X., 258
Hoisting-Cages, Attachment of Rope.....III., 215
Hoisting-Drums.....III., 244
Hoisting-Engine, Compound.....IV., 43
Hoisting-Engines in Pennsylvania.....IV., 108
HOLBROOK, F. N., Some Old Gold Mills.....VIII., 61
HOLLERITH, H., An Electric Tabulating System.....X., 238
Burlington Brake Tests.....IX., 43
HOLLEY, ALEXANDER L., Obituary.....225
HOLLICK, A., A Few Words in Regard to the Sewerage and Drainage of the Village of New Brighton, Staten Island.....X., 202
A Discussion of Certain Points in Connection with the Sewerage and Drainage in the Village of New Brighton, Staten Island.....X., 302
HOOPER, L. M., the Dynagraphometer.....I., 70
a New Planimeter.....I., 169
Horse-Power, Cost with Various Motors.....III., 300
House Drainage, How to Examine.....IV., 47
HOUSES, Sanitary Condition.....III., 21
Hudson River Tunnel.....IV., 90
HÜBL Method for Testing Oils and Fats.....VI., 276
HUEBNER Disintegrator.....IV., 309
HUGHES, HERBERT W., The Thick Coal of South Staffordshire.....VII., 235
Winding-Engines.....X., 258

PAGE
HUMAN Period, Chronology of.....X., 318
HURD Mine.....IV., 119
Huronian. See Geology.
"HUTCHWORK".....IX., 77
HUTTON, F. R., Cranes.....V., 127
Electrical Engineering at a Technical School.....IX., 69
Notes on Machinery.....I., 82, 128
Notes on Railway Block Signals.....VIII., 54
Relation of Electrical and Dynamic Units.....IX., 341
Tests of Non-Conducting Materials.....III., 145
Use of Mineral Wool.....III., 146
Hydraulic Boring-Machine (Brandt's).....III., 139
Hydraulic Mining.....III., 84
HYDRAULICS:
CORNISH Pumps in Marquette Mines.....III., 246
DAMS, Wing.....IV., 35
Wooden.....VIII., 186
DIRECT Acting Pumping Engines.....I., 173
FLOW of Streams.....IX., 227; X., 72
Flow of Water in Pipes.....III., 299
Harbor Improvements at Galveston.....II., 218
MOVEMENT of Solid Bodies in Water.....IX., 140
Oscillations in Lake Michigan at Chicago.....IX., 94
Percolation of Water Through Sand.....IV., 148
Pipe-Surface, Calculation of.....IV., 42
Sorting of Screen-Sized Ores.....IV., 298
SOUNDINGS, River and Harbor.....IV., 26
TIDE-GAUGE.....IV., 25
WATER-Power, Appraisement of Damages to.....IX., 220, 319
Wedges.....IV., 54
WISCONSIN and Fox Rivers, Improvement.....IV., 30
HYDROBROMIC Acid.....V., 60
Hydrochloric Acid. See Analytical Chemistry.
HYDROFLUORIC Acid on Silica and Silicates, Action of.....V., 115; VII., 384
Hydrogen Peroxide in Analysis.....X., 277
HYDROMETERS, the Modulus of.....VI., 153
Hydrostatic Pressure, Tests by.....VI., 167
Hydrosulphuric Acid.....X., 376

I

ICE, Eroding Power of.....VI., 142
ILES, MALVERN W., *Colorado Minerals*.....III., 142
Decomposition and Analysis of Slags.....V., 351
Manganese in Slags Formed by Argentiferous Lead Smelting.....V., 217
Separation of Lead Sulphate and Silver-Salts from Silicic Acid.....III., 223
IMPROVISED Surveying Instruments.....VII., 145
INACCESSIBLE Distances in Surface and Underground Surveying.....III., 25

PAGE

IN Camp on a Preliminary Survey....VIII., 75
Incline, Self-Acting....III., 142
INCLINED Planes of Morris Canal....III., 283
INDEX of Current Literature Relating to North American Geology, VIII., 172, 285, 375; IX., 85, 158
Indicator Card, Corliss Engine....X., 274
Cards, a New Planimeter for Measuring....I., 169
INDUSTRIAL CHEMISTRY. See also Metallurgy.
ACETIC Salts, from Wood....IX., 164
Albumin, Preparation....VI., 285
Blast Furnace Slag for Cement....III., 300; IV., 238
CHEMICAL Fibre, Manufacture....X., 163
Chemical Qualities, Foundry Irons....X., 147
Coal-Gas, a New Residual Product from....V., 277
Coal Gas....IV., 239
Creosote for Timber....IV., 232
Disinfection Instructions....IV., 48
Distillation of Pine Wood....IX., 162, 190
ELECTROPLATING with Iridium....VI., 97
with Silver....III., 30
Explosives, New....IV., 239
Filtering Cloths, Preservation of....III., 301
Fractional Distillation of Naphtha with Steam....VI., 375
Gas, Purification of....IV., 239
Glycerine Adulteration....IV., 239
Illuminating Power in Relation to Composition of a Coal....VI., 167
Iron, Rustless....IV., 227
KAOLINIZATION....VI., 1
Kyan Process for Timber....IV., 233
Magnesia, Preparation of....III., 302
Nitric Acid, Causing Combustion....III., 302
NITROGLYCERINE....IV., 15
Manufacture in France....II., 213
Nobel's Blasting-Gelatine....III., 296
Oxygen, Preparation from Air....V., 277
at Ordinary Temperature....V., 59
Paper Gas-Pipes....V., 286
PAPER-HANGINGS....II., 27
Phosphorescent Paint....III., 300
Phosphoric Slags, Utilization....V., 161
PINE Oil....IX., 176
PYROLIGNEOUS Acid....IX., 177
Rackarock....III., 50
Roessler's Method of Manufacturing Sulphuric Acid, and Sulphate of Copper, V., 164
SOAP, Manufacture of....I., 119
Sugar Industry of Hawaii....II., 212
Sulphur Manufacture at Swansea....IV., 127; V., 164, 275, 279
Tanning....III., 302

PAGE

INDUSTRIAL CHEMISTRY—*Continued.*
Timber, Preservation of.....IV., 232
Titanium, Iron High in.....V., 160
WALL Papers.....II., 27; X., 280
Water, Action Iron Pipes on.....X., 284
Waterproof Paint for Textiles.....IV., 238
Zinc Foil in Boilers.....IV., 43
INFLUENCE of Copper on the Estimation of Sulphur.....VIII., 74
of the Technical Sciences upon General Culture.....VII., 67
Ingot Casting, New Method of.....V., 273
Moulds.....V., 157
INGRAM, E. L., Planimeter.....VI., 347
INQUARTATION.....I., 43; VII., 8; VII., 257
INSTRUCTION in Architecture at the School of Mines.....X., 29
INTERCOLLEGIATE Boat Racing.....VIII., 368
International Congress of Applied Mechanics.....X., 276
Congress of Mines and Metallurgy.....X., 275
Standards for Analysis, Iron and Steel.....X., 336
INTERSECTIONS, Projected.....I., 155
INVENTION and Skill.....IX., 40
INVERSION Process Applied to Beet-Root Sugars.....VI., 257
INVERT-SUGAR by Alkaline Copper Solutions.....I., 11
Iodide of Mercury, Solubility of.....VI., 286
Iodine and Chlorine, Separation by Dry Method.....VI., 283
Determination of, in Mixtures of Iodides, Bromides and Chlorides.....V., 278
Estimation of.....X., 281
in Blowpiping.....X., 322
IRIDIUM.....VI., 97
Bibliography of.....VI., 114
IRON. See also Analytical Chemistry and Industrial Chemistry.
Iron Assay Notes.....II., 173; III., 53
Chilling, Properties of.....II., 140
Effect of Heat on Strength.....IX., 92
of Phosphorus and Silicon on.....I., 45; X., 148
Inspection at Pittsburgh.....IV., 45
Irregularities in Castings.....X., 160
Meteoric from South Carolina.....VIII., 31
Production of Chilling.....III., 53
Resources of Alabama.....IV., 225
Separation of Nickel and Cobalt from.....VIII., 335
Sulphur in.....VI., 284; X., 198, 279
versus Mild Steel.....VIII., 185
IRON and Nickel, A Crystalline Subsulphide.....IX., 93
Iron and Steel, Test-Board for.....IV., 42
International Standards for Analysis,.....X., 336
Microscopic Structure of.....IV., 225
Iron and Zinc, Relative Expansion.....IV., 231
Iron Bridges *versus* Stone Bridges.....VIII., 186
Iron Carburets, the Electric and Magnetic Properties of.....VII., 24

PAGE

Iron Columns, Strength of....IV., 233
Iron Companies, Andover, Bethlehem, Glendon....IV., 119
Iron Mines of New Jersey....IV., 111
of Marquette....III., 35, 103, 197, 243
CHAMPION....III., 40, 111, 197, 203, 250
CHEEVER....IV., 98
CLEVELAND....III., 106, 197, 201, 246, 248
DICKERSON....IV., 120
FOREST OF DEAN....IV., 118
HIBERNIA....IV., 119
JACKSON....III., 107, 199, 244, 247, 250
LAKE SUPERIOR....III., 48, 103, 112, 197, 201, 249
MICHIGAMME....III., 46, 110, 197, 246, 251
MOUNT HOPE....IV., 114
NEW YORK....III., 105, 114, 202, 244, 250
REPUBLIC....III., 47, 112, 198, 243, 250
TEABO....IV., 117
TILLY FOSTER....VI., 280; IX., 1
Iron Mining....IV., 98
IRON ORES:
Alabama Iron Resources....IV., 225
CRYSTALLINE Iron-Ore of Utah....II., 9
DRESSING of Adirondack Magnetite....IX., 151
of Non-Bessemer Ores....IX., 145
Ferruginous Schists and Iron-Ores of the Lake Superior Region....VIII., 188
FOSSIL Ore of Clinton Group....II., 13
GENESIS of....II., 1
LIMONITE in Richmond County, N. Y....II., 169
LIMONITES, The....II., 15, 169
MAGNETITES, The Laurentian....II., 5
Method of Working in Thick Deposits....IV., 98
Notes on Methods of Analysis....I., 81, 127
of Lake Superior....VIII., 188
P and Ti in....X., 279
Qualities of, for Foundry Irons....X., 152
of Utah....II., 9
Iron Pipes, Action of, on Water....X., 284
Iron Pots, for Solution of Gold Alloy....I., 45
Iron Pyrites....VII., 250
Iron Region, the Marquette....III., 35, 103, 197, 243
Iron Roofing for Undergound Chamber....IV., 242
Iron Rods for Roof-Laths....IV., 58
Iron Sulphate Crystallization at Agordo....IX., 264
Iron Works....IV., 227
IRVING, R. D., the United States Geological Survey....IV., 284
ISLAND Pyramids in the Lake of Mœris....VI., 130
ISOMERISM in the Aromatic Series....II., 201

PAGE

J

JACKSON MINE. See Iron Mines.
JAPAN, Placer Deposits in.....III., 15
JENNEY, WALTER P., Graphitic Anthracite in the Parker Mine, Wood River, Idaho.....X., 313
Notes on the Dry Lakes of Southern Nevada and California, with Relation to the Loess.....X., 316
JIGGING, Contribution to the Theory of.....IX., 278
of Ores.....IV., 203
JIGS.....V., 8
Jumper-Drill.....III., 139

K

KAOLINIZATION.....VI., 1
KEMP, J. F., a Brief Review of the Literature on Ore-Deposits.....X., 54, 116, 326
Notes on Lead Smelting in Southeastern Missouri.....IX., 212
Notes on Ore-Deposits and Ore Dressing in Southeastern Missouri.....IX., 74
KEROSENE, Method of Testing.....I., 130
KERSANTITE.....VIII., 330
Kjeldahl Process Applied to Nitric Nitrogen.....X., 378
Applied to Water Analysis.....X., 377
of Nitrogen Determination.....IX., 241
KNICKERBOCKER Avenue Sewer Outlet.....IX., 178
KOEPE System of Winding.....X., 270
KRAKATOA, The Eruption of, in 1883.....X., 132
KUNHARDT, W. B., The Present Aspect of Ore-Dressing in Europe.....
IV., 179, 298; V., 8, 140, 388
(Transl.), the Influence of the Technical Sciences upon General Culture, VII.....67
(Transl.), on New Features in Teledynamic Transmitters.....VIII., 93, 220

L

LABYRINTH for Classification of Slimes.....IV., 314
LAKE Basins, Excavation of.....VI., 149
Lake Michigan, Oscillations at Chicago.....IX., 94
Lake Superior Mine. See Iron Mines.
Lake Survey, United States.....IV., 229
LANE Drum.....III., 245
LARAMIE Coal Group.....IX., 329
LATERAL Pressure of Sand Against Retaining Walls.....IX., 109
Pursuit, The Right of.....VII., 357
LATITUDE.....VI., 40
LAURENTIAN. See Geology.
LAUTENTHAL, Parting of Gold and Silver at.....VI., 240
LEACHING Roasted Copper-Ores at Agordo.....IX., 256
System in Manufacture of Chemical Fibre.....X., 167

PAGE

LEAD:
Analysis ..... X., 373
Chloro-Bromide of ..... II., 211
Determination of Sulphur in ..... II., 211
Furnaces, Calculation of Charge for ..... IX., 373
Minerals, from Old Telegraph Mine, Utah ..... I., 198
Ores, in Gash Veins and Chamber Deposits ..... I., 93, 97
Purifying ..... IV., 130
Slags Analyses ..... IX., 218
Smelting, Argentiferous, in West ..... V., 57, 217
Smelting at Viallas ..... V., 55
Smelting in Southeastern Missouri ..... IX., 212
Sulphate and Silver-Salts, Separation from Silicic Acid ..... III., 223
to Detect Small Amounts of Silver in ..... IV., 54
Volumetric Determination of ..... X., 281
LEAD and its Alloys, Action of Hot Concentrated Sulphuric Acid on ..... II., 177
the Action of Cold Concentrated Sulphuric Acid on ..... II., 97
LEAD DESILVERIZATION:
at Pribram ..... IV., 63
by Zinc ..... III., 161
Pattinsonnage, Scheme of ..... IV., 130
LEGG Mining Machine ..... IX., 304
LEGGETT, T. H., The Hanging Compass and Arc for Mine Surveying ..... V., 46
Native Silver-Ores and Their Treatment at Batopilas ..... VI., 57
LETTER from President Barnard ..... VIII., 164
Levelling, Convenient Device in ..... VIII., 286
LIBRARY Regulations, etc ..... V., 66, 382; VI., 87
Library of Columbia College Additions in the Department of Natural Science, Useful and Fine Arts,
II., 235; III., 60, 151, 229, 308; IV., 66; V., 71; VIII., 167, 281, 282, 373; IX., 83, 186, 289, 377; X., 91
Lick Observatory ..... VIII., 180
Life of Car-Wheels ..... V., 268
LIGHT, Chemical Action of ..... II., 42
The Measurement of Obstruction ..... VII., 35
Light-House, on a Rock Level with the Sea ..... III., 300
Lighting by Electric Light ..... III., 218
by Illuminating Stove ..... III., 218
Lightning, Injuries and Fires from ..... IV., 237
LIME Sludges, Washing of Chemical Fibre ..... X., 170
LIMESTONE, Veins Formed by Action of Water ..... I., 93, 97
for Mortar, where Found ..... I., 58
for Roads ..... I., 36
Strength of ..... I., 39
LIMONITE in Richmond County, N. Y. ..... II., 169
LIMONITES, The ..... II., 15
LINEAR Transmission ..... VIII., 227
LITERATURE on Kjeldahl Process for Nitrogen ..... IX., 246
on Iridium ..... VI., 114
on Mining ..... X., 176

PAGE
LITERATURE on Ore-Deposits, Review of.....X., 54, 116, 326
Relating to American Geology.....VIII., 172, 285, 375; IX., 85, 188
LITHIA. See Analytical Chemistry.
LITTLE, W. P., the Westmoreland Shaft.....II., 103
LOADED Wagon System of Hoisting.....X., 262
LOADS, Concentrated Rolling.....VIII., 317
LOCOMOTIVE Haulage in Pennsylvania Coal Mine.....II., 196
Locomotives, Compressed Air Mine.....II., 215
Underground Haulage by.....II., 214
Loess. See Geology.
LONGITUDES, Astronomical.....VI., 39
"LONG TOM".....III., 82
LONGWALL Method.....IV., 56, VII., 246
Loss in Slimes at Ems.....IV., 320
LOSSES due to "Float".....IV., 314
LUMBER, the Seasoning of.....IX., 94
LUSK, Graham, The Luray Caverns.....VII., 148
LUZON Process for Copper-Ores.....IV., 6

M

MACADAM Road.....IV., 236; X., 291
Machine Drills.....IV., 55
Machine Mining in the St. Louis Coal Region.....IX., 299
MACKINTOSH, J. B., Action of Hydrofluoric Acid on Silica and Silicates VII., 384; VIII., 115
Graphite, Determination of, in Minerals.....VI., 159
Herderite a Calcium and Glucinum Phosphate and Fluoride.....V., 131
Manganese Methods.....VI., 35
Note on Iron-Ore Analysis.....I., 127
Separation of Nickel and Cobalt from Iron.....VIII., 335
Some Causes of Error in Blank Analyses.....IX., 81
Magnesia Preparation.....III., 302
Magnetic Dressing.....III., 297
Magnetic Oxide of Iron.....IV., 227
Magnetic and Electrical Properties of the Iron Carburets.....VII., 24
Magnets for Extraction of Pyrites.....III., 55
MANGANESE. See also Analytical Chemistry.
Manganese, Extraction from Ores.....V., 161
Effect of, on Steel.....II., 139
Manganese-Bronze.....V., 271
Mansfield Coal Mine, Longwall Working at the.....IV., 56
MANUFACTURE of Chemical Fibre.....X., 163
MAP. See Geology.
MARBLE, as a Building Stone.....I., 56
Deposits of Western United States.....X., 69
of Hawkins County, Tenn.....IX., 112
of Tempiute Mountain.....X., 70
of Utah.....X., 71

PAGE

Marble of Western Colorado.....X., 71
Strength of.....I., 39
Marine Engines, Getting off Centre.....V., 154
Marquette Iron Region.....III, 35, 103, 197, 243
Marsac Mill, Russell Process at.....X., 185
MARSHFIELD, Mass., Reclamation of Tideland at.....III., 118
MATERIALS Ejected from Krakatoa.....X, 141
MATTE Roasting at Agordo.....IX., 271
at Ducktown.....VII., 178
Point Shirley.....VII., 374
at Vershire.....VII., 306
Matte Bessemerizing.....VI., 320
Furnace, Herreshoff's.....VII., 318, 320
Fusion at Agordo.....IX., 266
Fusion at Ducktown.....VII., 174, 182
Fusion, Point Shirley.....VII., 366
Mattresses, Mode of Manufacture of.....II., 219
MAYNARD, GEORGE W., Dressing of Non-Bessemer Ores.....IX., 145
MCLOUGHLIN, C. S., Action of Sulphurous Anhydride on Benzine.....VIII., 253
MEASURES, Systems of.....IX., 193, 291
Measurement of Base Lines.....IV., 231
of Distances by Pacing.....I., 1
of Light Obstruction.....VII., 35
MECHANICAL Energy, The Transformation of Electricity into.....X., 123
MECHANICAL ENGINEERING and the Civil Engineer.....I., 148
Society.....I., 128; III., 50; IV., 42; V., 62
MECHANICAL ENGINEERING. See also Hydraulics, Hoisting, Mining Engineering, etc.
Air and Steam in an Engine-Cylinder.....IV., 42
BAND-BRAKE.....III., 245
BISULPHIDE of Carbon Engine.....VII., 210
Blowing Engines versus *Fans*.....IV., 237
Boiler Explosions.....V., 155, 156
Boiler Resetting for "Fuel Oil."....X., 353
Burlington Brake Tests,.....VIII., 376; IX., 43
Compressed Air Drills.....IV, 121
CRANES.....V., 127
Crushing Test, Building Stone.....V., 266
Cut-off.....IV., 43
FORGING, Heat Developed.....V., 271
FRICTION-Clutch, Mechanics of.....VI., 118
Friction Gearing.....III., 245
Gravity Coal Piers at Hoboken.....IV., 62
Indicator Card Corliss Engine.....X., 274
Marine Engines, Getting off Centre.....V., 154
Metallic Rollers, Strength of.....VI., 282
Motors, Cost with.....III., 300
Paper Gas-Pipes.....V., 286
Porter-Allen Engine Shaft.....IV., 42

PAGE

MECHANICAL ENGINEERING—*Continued.*
Punch for Rails.....IV., 228
Rackroad.....III., 217
Rotary Boring Machine.....III., 139
SAFETY-CLUTCHES.....III., 243
Safety-Gates, Automatic.....III., 215
Safety-Valves, Formulæ for.....VI., 282
SPEED Indicator.....I., 82
Splicing Wire Rope.....III., 295
Steam Engine Indicator.....IV., 43
STEAM Hammers.....II., 35
Steam-Pipe Covering.....IV., 243
Water Rams in.....IX., 384
TELEDYNAMIC Transmitters, New Features in.....VIII., 93, 220
Testing Machine.....IV., 233
Tests by Hydrostatic Pressure.....VI., 167
V-GEARING.....III., 245
Water-Pipes, Cleaning.....V., 5
WATER-Wheel at Morris Canal Inclines.....III., 285
Wire Gauge, Metric.....IX., 383
Mechanical Origin of Gold in Placers.....III., 8
MECHANICS of the Friction Clutch.....VI., 118
MEISSL'S Method, Determination of Sugar.....X., 18
MEISSNER, C. A., Notes on Some Chemical Qualities of Foundry Irons.....X., 147
Nickel and Cobalt Separation.....I., 184
MENDHEIM Continuous Gas-Furnace for Burning Fire-Brick and Porcelain, VIII., 34
Mercury. See Analytical Chemistry.
Mercury in Stamp Mortar.....III., 93
Iodide, Solubility of.....VI., 286
MERRIAM, A. C., a Greek Tunnel of the 6th century, B.C.....VI., 264
MERRILL, F. J. H., Index of Current Literature of North American Geology, VIII., 172, 285, 375; IX., 85, 188
MERRIMAN, M., Theories of the Lateral Pressure of Sand Against Retaining-Walls.....IX., 109
MESEROLE, W. M., The Docks of New York.....II., 78
Metal Castings, Dense.....V., 272
Metallurgical Practice in Utah.....V., 57
METALLURGY. See Blast-Furnace, Copper, Foundry, Fuels, Gold, Iron, Lead, Silver, Slags, Steel, etc.
METEORIC Iron from Independence County, Arkansas.....VII., 188
from South Carolina.....VIII., 31
Crystalline Structure.....VIII., 90
Meteorology.....V., 167
METHOD of Moments, Ritters Arbitrary Assumption in his.....IV., 86
Method of Working Thick Deposits of Iron-Ore.....IV., 98
Metric Wire Gauge.....IX., 383
METRICAL Equivalents.....V., 380
Metrological Society, American.....VIII., 177
Metrological System of the Great Pyramid.....V., 97, 193, 289, 388

PAGE

MEXICAN Notes.....I., 105
Process for the Treatment of Silver-Lead Ores.....IV., 133
Process of Copper-Smelting.....IV., 122
Michigamme Mine. See Iron Mines.
Microscopic Organisms, Destruction of.....III., 301
Physiography of the Massive Rocks.....IX., 362; X., 43
Tests of Flour.....III., 302
Middle Third Theory for Stone Arches.....VI., 209
MILAN Mine, N. H.....VII., 311
Mild Steel versus *Iron*.....VIII., 185
MILLER, R. P., Western Union Time System.....X., 218
Mine-Bosses, Education of.....II., 140
Mine-Contracts at Marquette.....III., 247
Mine Gangways.....III., 292
Mine-Locomotives, Compressed Air.....II., 215
Mine Rules and Regulations.....III., 252
Mine-Surveying. See Surveying.
the Hanging Compass and Arc for.....V., 46
"MINERAL".....IX., 76
MINERALOGY:
Altaite.....I., 198
Amarantite.....X., 188
Amber.....IV., 239
Auerlite.....X., 188
Barytic Feldspar.....X., 288
Bertrandite.....X., 287
Beryllonite.....X., 188
BLOW PIPE Analysis.....VIII., 359; X., 190, 320
Bückingite.....X., 188
Caryopilite.....X., 379
Celestite.....X., 379
Cryolite.....VI., 284
Dahllite.....X., 188
Descloizite.....X., 379
DIAMONDS, Artificial.....I., 140
Genesis of.....VIII., 188
Dufrenite.....X., 381
Dumortierite.....X., 287
Edisonite.....X., 187
Eudidymite.....X., 381
Fluocerite.....X., 381
Fluohydric Acid for Decomposition of Samarskite and Allied Minerals..V., 276
FRANKLINITE.....VIII., 148
GEMS.....II., 58
Gold, Genesis of.....III., 6
GRAHAMITE.....VIII., 332
GRAPHITE.....VI., 159; VIII., 334
Heliophyllite.....X., 381
HERDERITE.....V., 131

PAGE

MINERALOGY—*Continued.*

Hohmannite.....X., 188
Horsfordite.....X., 188
Inesite.....X., 381
Iodine in Blowpiping.....X., 322
KAOLINIZATION.....VI., 1
Kaolinite.....X., 382
Kauri Gum.....II., 214
Langbanite.....X., 287
Lansfordite.....X., 188
Lead Minerals, from Utah.....I., 198
Leading Minerals.....II., 112
LIMONITE.....II., 15, 169
Magnetite.....II., 5; IV., 227; X., 382
Martite.....X., 382
Mazapilite.....X., 188
Melanophlogite.....X., 286
Metastibnite.....X., 383
METEORIC Iron.....VII., 188; VIII., 31, 90
Millerite.....I., 41
Minerals of Colorado.....III., 142
Mineral Tables.....VI., 339
MINERAL Veins, Classification of.....I., 96
Monazite.....X., 287
MUSEUM at Bethnal Green, London.....II., 71
Nagyagite.....I., 198
NATURAL System in Mineralogy.....VII., 386
Neochrysolite.....X., 286
NOTES.....I., 41, 84, 198; II., 220; V., 16
Ochrolite.....X., 383
Paposite.....X., 383
PETROGRAPHY, Modern.....X., 212
PLASTER Tablets.....X., 320
PLATINUM.....I., 88
Polydimite.....X., 383
PRECIOUS Stones.....II., 58
Proustite.....X., 287
Pyrargyrite.....X., 287
PYRITE.....I., 34; VII., 154, 218, 250, 301
Pyrrhoarsenite.....X., 188
QUARTZ.....III., 11, 90; VI., 286; VII., 334; X., 383
Quenstedtite.....X., 188
Rhodotilite.....X., 384
Riebeckite.....X., 188
Sellaite.....X., 384
Silica and Silicates, Action of Hydrofluoric Acid on.....VII., 384; VIII., 115
Solution for Mineral Separation.....V., 165
SOUTH CAROLINA Meteoric Iron.....VIII., 31
Sperrylite.....X., 187

PAGE

MINERALOGY—*Continued.*
Sulphohalite.....X., 187
TEPHROITE.....VIII., 152
Tin Mines, Banca.....VII., 99
Valentinite.....I., 198
Webskyite.....X., 384
WILLEMITE.....VIII., 151
ZINCITE.....VIII., 149
Mineral Wool, Corrosive Action of.....IV., 42
The Use of.....III., 146
MINES. See also Coal, Copper, Iron Mines, Lead, Silver, Gold, etc.
of Alabama.....IV., 225
of Georgia.....III., 213
of Georgetown.....VI., 139
of North Carolina.....III., 208
of Sweden.....II., 214
of the Appalachian Range.....III., 208
of Prussia, Experiments and Improvements During 1881 *in*.....IV., 54
of Blue Hill, Maine.....VII., 312
MINING ENGINEERING. See also Hoisting, Shaft, etc.
Accidents at Marquette.....III., 250
"Barney,".....IV., 106
Beach.....VII., 118
Books.....X., 176
Cages.....III., 243
Cars.....III., 193; IV., 102
Cement, Grouting.....III., 292, 298
Chamber Working.....III., 112
Claims in Colorado, Surveying of.....II., 116
Contracts.....III., 248
Diamond Drill.....II., 142
Drift.....VIII., 204, 289
Drifting.....III., 117; IV., 56
Drills.....III., 139, 197; IV., 55; VI., 281
Electric Signaling in.....IX., 357
Explosives.....III., 40, 50, 140, 141, 199, 296; V., 266
Gravel.....III., 210; V., 373; VII., 106
in Mexico, Methods of Blasting, Pumping, and Handling Ore.....I., 105
Locomotives.....II., 196, 215
Longwall System.....IV., 56; VII., 246
Masonry Supports.....VI., 289
Methods at Marquette.....III., 110
Mining Machines.....IX., 304, 307
of Anthracite, Pennsylvania.....IV., 100
of Iron-Ore in New Jersey,.....IV., 121
of Silver, Leading Minerals or "Pintas,".....II., 112
of Thick Deposits of Hematite.....IV., 98
Ore-Docks L. S.....III., 207
Payment.....III., 249

PAGE

MIINNG ENGINEERING— *Continued.*
Pillar Working....IV., 56, 59
Placers....III., 79; VII., 101
Pumping....III, 240, 246; IV., 243
Prospecting....III., 137; IV., 113; X., 236
Refuges....IV., 244
Relief Clubs....III, 251
Reserve Fund and Working Capital....II., 113
River and Bar....VII., 127
Rock-Filled Deposits, Working....IV., 56
Safety Gates....IV., 106, 109
Signalling....III., 137, 216, 243; IV., 37; IX., 357
Sluice....III., 83; VII., 110
Square Working....III., 246; VII., 242
Surface Handling....III., 111, 201
Timbering....III., 115; IV., 58, 242
Tools....IV., 54
Underground Handling, II., 194, 195, 198; III., 182, 200, 203; IV., 100, 103, 242, 243
Wages....III., 249
MINING-LAW....V., 242; VII., 197, 357; VIII, 235; IX., 88
MINING-PUMPS, Direct Acting....I., 176
MINTS, Table of Work of U. S....VII., 4
MISSISSIPPI, Flow of Streams at its Upper Waters....X., 72
MISSOURI, Lead-Smelting in Southeastern....IX., 212
Ore-Deposits and Ore-Dressing in Southeastern....IX., 74
MIXER for Concrete....VI., 308
MODULUS of Hydrometers....VI., 153
MOELLER, WALTER, The Hübl Method for Testing Oils and Fats....VI., 276
MŒRIS, the Wonder of the World....VI., 71
Island Pyramids in the Lake of....VI., 130
MOULDS, Ingot....V., 157
Monuments for Surveys....IV., 229, 280
Morphine in Opium, Determination of....VI., 375
MORRIS Canal, Inclined Planes....III., 283
MOSES, A. J., Mineralogical Abstracts....X., 187, 286, 379
Notes on Blowpipe Analysis....X., 320
Scheme for Blowpipe Analysis....VIII., 359
Tables for the Determination of Minerals....VI., 339
Motors, Cost of Work with Various....III., 300
MOUNT HOPE Iron Mines....IV., 114
MOUNTAIN, Our Grandest....V., 152
MOVEMENT of Solid Bodies in Water....IX., 140
MULE Haulage in Pennsylvania Coal Mine....II., 195
MUNROE, PROF. H. S., A Contribution to the Theory of Jigging....IX., 278
Inaccessible Distances....III., 25
List of Books on Mining....X., 176
Mine Surveying....III., 269

PAGE

MUNROE, PROF. H. S., Movement of Solid Bodies in Water....IX., 140
Pedometer as a Surveying Instrument....I., 1
Placer Deposits in Yesso....III., 15

N

Naphtha Distillation in Current Steam....VI., 375
NARCOTICS and Stimulants....I., 74
National Geographical Society of Washington....IX., 383
NATIVE Silver-Ores and Their Treatment at Batopilas....VI., 57
Native Sulphur, Extraction of....V., 275, 279
NATURAL System in Mineralogy....VII., 386
NAVARRO, J. A., Ærostation....I., 110
Some Notes upon the Berlin Stadtbahn....IV., 9
The Carpenter Continuous Automatic Air-Brake....V., 132
NEOVOLCANIC Rocks....X., 52
Nessler Reagent Modified by L. Dobbin....X., 277
NEVADA and California, Dry Lakes of....X., 316
NEWBERRY, PROF. J. S., Coals of Colorado....IX., 327
Deposition of Ores....V., 329
Dry Concentration of Ores....IV., 1
Earthquakes....VIII., 1
Eroding Power of Ice....VI., 142
Future of Gold and Silver....IX., 97
Genesis and Distribution of Gold....III., 5
Genesis of our Iron-Ores....II., 1
Geological Notes....VIII., 327; X., 66
Oil-Fields of Colorado....X., 97
Origin and Classification of Ore-Deposits....I., 87
Physical Conditions of the Formation of Coal....IV., 169
Street Pavements of New York....X., 289
Uneducated Reason in the Cicada....VII., 152
NEWBERRY, S. B., the Study of Chemistry in Germany....V., 1
NEWBERRY, W. E., Arizona Copper....VI., 370
NEWBROUGH, W., Notes on Preliminary and Location Railroad Surveying in the West....X., 1
NEW BRIGHTON, Staten Island, Sewerage and Drainage....X., 202, 302
NEWFOUNDLAND Copper Mines....VII., 312
NEWHOUSE, E. L., Calculation of Charge for Lead Furnaces....IX., 373
NEW JERSEY Iron Mines....IV., 111
Archæan Areas....IX., 33
NEW-MEXICO Ore-Deposits....VI., 138
NEW YORK CITY, DOCKS....II., 78
"Fuel Oil" for Stationary Boilers....X., 350
Gold and Silver Refining at the Assay Office....II., 18
Parting Gold and Silver at U. S. Assay Office....VII., 1
Sanitary Problems of....I., 131
Street Pavements....X., 289
Water-Supply....IX., 380

PAGE

New York Mine. See Iron Mines.
NICARAGUAN Woods, Flint's Investigation....IX., 6
Nicholson Pavement....X., 294
Nickel. See Analytical Chemistry.
and Iron Sulphide Crystalline....IX., 93
Matte Concentration....V., 161
Metallurgy in the United States....IV., 53, 226
Mine Berg, at Lengen, Norway....V., 266
Ore, Specimen of....I., 41
Nitrates. See Analytical Chemistry.
Nitric Acid. See Analytical Chemistry.
Nitrogen. See Analytical Chemistry.
Nitroglycerine. See Industrial Chemistry.
Boiling of....III., 250
NITROMOLYBDIC ACID, Preparation at Maximum Concentration....V., 104
NITROSACCHAROSE....IV., 17
Nitroso β Naphthol in Quantitative Analysis....X., 370
Nitrous Acid in Water....X., 378
in Presence of Nitric....X., 284
Nobel's Blasting-Gelatine....III., 296
NON-BESSEMER Ores, the Dressing of....IX., 145
Non-Conducting Materials....III., 145
Non-Conductors, Heat Conduction in....VI., 166
NORTH AMERICAN Geology, Index to Current Literature Relating to VIII., 172, 285, 375; IX., 85, 188
NORTH BLOOMFIELD Gravel Mine, A Clean-Up....V., 373
North Carolina, Mines of....III., 208
NORTHROP, J. I., The Eruption of Krakatoa in 1883....X., 132
Norway Iron Works....IV., 227
NOTE Book, Barometric....VI., 51
Notes on Bridge Steel....IX., 248
Nuggets, the Origin of....II., 139
NUGGETS, LIST OF LARGE....III., 6, 72

O

OBITUARY NOTICE, Clark, Henry G....III., 62
Hodges, H. A....V., 74
Holley, Alexander L....III., 224
MacMartin, Archibald....II., 225
Olmstead, Owen F....III., 152
OBSERVATORY Columbia College....V., 173
The Lick....VIII., 180
O'CONNOR, M. J., on Steam Hammers....II., 35
O'CONNOR, T. D., Analyses of Coffee....I., 13
OILS and Fats, Hübl Method for Testing....VI., 276
OIL Fields of Colorado....X., 97
OPEN Cuts....III., 110
Open Hearth. See Steel Processes.

PAGE

OPIUM, Hashish, and Allied Stimulants and Narcotics.....I., 79
Determination of Morphine in.....VI., 375
OPTICAL Phenomena Caused by Eruption of Krakatoa.....X., 145
ORATION, Centennial.....VIII., 261
ORE-BODIES, Character of, in Marquette Iron Region.....III., 40, 103
ORE-DEPOSITS:
Classification of.....I., 87; X., 331, 334
CRYSTALLINE Iron-Ore of Utah.....II., 9
DEPOSITION of Ores.....V., 329
DISTRIBUTION of Gold.....III., 6
DRIFT Deposits.....VI., 147
EDWARDS Mine, Formation of.....III., 44
FAHLBANDS.....I., 92
Ferruginous Schists and Iron-Ores of the Lake Superior Region.....VIII., 188
GENESIS of Gold.....III., 6
of Iron-Ores.....II., 1
Marquette Iron Region.....III., 40, 42, 46, 48, 103, 105
MOUNT HOPE Iron Mines.....IV., 114
Origin and Classification.....I., 87
PLACER Deposits.....I., 88; III., 5, 15; VII., 101
POCKETS of Ore.....I., 93; III., 206
PYRITE Deposits of the Alleghanies.....VII., 154, 218, 301
QUICKSILVER Deposits of California.....IV., 294
Review of Literature on.....X., 54, 116, 326
Southeastern Missouri, Notes on.....IX., 74
Southwestern New Mexico, Notes on.....VI., 138
TIN Mines, Banca.....VII., 99
VERMONT, Copper Deposits.....IV., 219
VERSHIRE Copper Mines.....VII., 301
Victoria Quartz Reef in Gold, Origin.....V, 166
ORE-DOCKS at Marquette, L'Anse and Escanaba.....III., 207
ORE-DRESSING. See also Concentration, Dressing, Stamps, etc.
Blende and Pyrites, Separation of.....III., 54
BRINK Disintegrator.....IV., 309
BUDDLE.....V., 11; VIII., 343
CHILIAN Mill.....III., 92
CLASSIFICATION by Sizing.....IV., 181
Hydraulic.....IV., 312
Cleaning Coal by an Air-Blast.....IV, 59
Cleaning Ores.....IV., 182
Coal Washing, Mech. Assays for Control of.....III., 218
COBBING.....IV., 195
Crushing Gold Quartz.....III., 91
New Form of Apparatus.....IV., 306
Sizes Produced in.....IV., 310
DINGEY Pulverizer.....IV., 306
DISINTEGRATOR, Vapart Centrifugal.....III., 55
DRESSING of Adirondack Magnetite.....IX., 151
of Non-Bessemer Ores.....IX., 145

PAGE

ORE-DRESSING—*Continued.*
Dry Concentration....III., 127; IV., 1
FRUE Vanner....V., 27
HEBERLE Mill for Ore-Grinding....IV., 307
in Europe, Present Aspect of....IV., 179, 298; V, 8, 140, 388
in Southeastern Missouri....IX., 74
JIGGING....IV., 203; V., 8; IX., 278
of Non-Bessemer Ores....IX., 145
PADDOCKS Separator....III., 129
RITTINGER Tables....IV., 317
Separation Minerals of Equal sp. gr....III., 54
SHAKING Riddles....IV., 188
SLIME-DRESSING....IV., 300
SLIME-WASHERS, Patented....V., 26
Slimes, Waste....III., 297
SOLID Bodies, Movements in Water....IX., 140
Spiral Sieve....III., 297
SPITZKASTEN....IV., 315
SPITZLUTTE at Schemnitz....IV., 318
Standard Sieve Sizes....II., 216
SYPHON Separator....IV., 299
TAILINGS and Tail Sluices....III., 89
TAILS, Concentration of....III., 95
Treatment of Tailings at Przibram....IV., 127
Treatment of Native Silver....VI., 57
ORE KNOB Mine, N. C....VII., 224
ORE ROASTING....VII., 171, 364
ORE SAMPLING....III., 253; VI., 351
ORE-TESTING Works of the School of Mines....VI., 224
ORFORD Copper Furnace....VII., 314
ORIGIN of the Loess....X., 66
of Ore-Deposits....I., 87
of Graphite....VIII., 334
of the Charleston Earthquake....VIII., 64
OSCEOLA, Nev., Placer at....III., 9
OTSEGO LAKE, Survey of, by School of Mines' Students....IV., 277
OUTLET, Knickerbocker Avenue Sewer....IX., 178
OWEN, F. N., Sanitary Condition of City Houses....III., 21
Oxygen. See Chemistry and Industrial Chemistry.
OZONE Reactions....IV., 174

P

PACING, as a Method of Measurement....I., 1
PADDOCK Pneumatic Separators....III., 129
PAINTS, Analysis of Chrome....VIII., 81
PALÆOVOLCANIC Rocks....X., 51
PAN, the Miner's....III., 81
Paper Gas-Pipes....V., 286

PAGE

PAPER-HANGINGS.....II., 27
Paraffin, Generation of H_2S with.....III., 301
Paraffins, Some New.....VI., 375
Paris Observatory, the New Equatorial of.....V., 166
PARKER, A. McC., Sinking a Shaft Through Loose Material.....IX., 1
the Field-Work of a Survey for an Elevated Road Over a Crowded Thoroughfare.....X., 84
Fire-Brick and Terra-cotta.....I., 16
PARKER, R. A., Surveying Mining Claims in Colorado.....II., 116
PARKER MINE, Graphitic Anthracite in.....X., 313
PARSONS, W. B., Jr., Endless-Rope Haulage.....III., 182
Frame for Large Blue-Prints.....V., 49
Frogs and Switches.....V., 38
PARTIAL Solar Eclipse of March 16.....VI., 261
PARTING Gold and Silver at Lautenthal.....VI., 240
in California.....I., 43
in the U. S. Assay Office, New York....II., 18; VII., 1
in the U. S. Mint at Philadelphia.....VII., 253
PASTRANA Mine.....II., 107
PATENT Processes.....X., 102
PATIO, for Treatment of Silver-Ores in Mexico.....I., 109
PATTERSON'S Method, Determination of Sugar.....X., 17
Pattinsonnage, Scheme of.....IV., 130
Pavements of Streets.....IV., 236
of New York.....X., 289
PAVING Cements, Cohesion of.....X., 297
PAYMENT at Marquette Mines.....III., 249
PEDOMETER as a Surveying Instrument.....I., 1
Pemberton's Method of Titration, Modification of.....X., 377
Peppermint Test.....IV., 48
Percolation of Water Through Sand.....IV., 148
PERCUSSION Tables.....V., 20
PERCY'S Slag.....II., 173
Permanganate. See Analytical Chemistry.
Peroxide of Hydrogen. See Analytical Chemistry.
PERRY, NELSON W., Iridium.....VI., 97
PETROGRAPHY, Methods of Modern.....X., 212
Petroleum, as a Fuel in Metallurgy.....IV., 227; V., 156
as Fuel.....X., 357
for Blast-Furnace Chills.....IV., 226
Genesis of.....X., 101
in Roumania and Galicia.....II., 213
Phenol. See Analytical Chemistry.
PHILADELPHIA, Parting Process in the U. S. Mint at.....VII., 253
Phœnix Columns.....IV., 233
Phosphates, Insoluble.....X., 376
Phospho-Molybdate Precipitate.....X., 376
Phosphorescent Paint.....III., 300
Phosphoric Acid. See Analytical Chemistry.

PAGE

Phosphoric Slags, Utilization of.....V., 161
PHOSPHORUS. See Analytical Chemistry.
in Wood Charcoal.....IV., 238
PHYSICAL Conditions Under which Coal was Formed.....IV., 169
PIG-COPPER at Ducktown.....VII., 185
PIG-IRON Analyses.....X., 195
Rapid Determination, Si.....X., 371
Determination of Total Carbon.....III., 290
PILE Roasting at Agordo.....IX., 128
PILLAR Robbing in Coal Mines.....IV., 99
Working in Thick Coal Beds.....IV., 56
PINE Wood, Distillation of in the South.....IX., 162
PINON Coal Basin.....IX., 338
" PINTAS " or Leading Minerals.....II., 112
Pipe-Surface, Calculation of.....IV., 42
PITKIN, L., Action of Concentrated Sulphuric Acid at 100° C. on Lead and its Alloys.....II., 177
on the Action of cold Concentrated Sulphuric Acid on Lead and its Alloys, II., 97
Artificial Diamonds.....I., 140
Compound Platinates and a New Platino-Potassium Salt.....I., 64
Placers. See Geology and Mining Engineering.
PLANE Table.....VI., 45
" PLANILLA " at San Juan Mine.....III., 268
PLANIMETER.....I., 169; V., 347
PLANT Life, Relation of Aluminic and Ferric Salts to.....VI., 235
PLASTER Tablets in Blowpiping.....X., 320
Plateway, Lancashire.....IV., 144
PLATINATES, Compound.....I., 64
PLATINUM and Allied Metals from Superficial Deposits.....I., 88
Roughness on.....III., 301
Specific Heat of.....IV., 42
PLATTNER'S Process for Gold.....III., 97
PLENUM *versus* Exhaust Ventilation.....VI., 82
PLUMBING of City Houses.....III., 22
PLUMB-LINES for Transferring Line Down a Shaft.....III., 271
Plutonic Rocks.....IX., 368
PNEUMATIC Stamps.....IV., 304
POCKETS of Ore.....I., 93; III., 206
Poetsch Method of Sinking Through Quicksand.....V., 53, 154
POINT SHIRLEY Copper Works.....VII., 360, 381
Poisoning by Carbonic Oxide Gas.....II., 140
PONCELET'S Theory of Lateral Pressure of Sand Against Retaining Walls, IX., 110
PORCELAIN, the Mendheim Continuous Gas-Furnace for.....VIII., 34
PORTER, H. F. J.. " Fuel Oil " for Stationary Boilers in New York City.....X., 350
Porter-Allen Engine Shaft.....IV., 42
Potash and Soda, Separation from Iron, Aluminium, etc., in Silicates.....V., 59
Potassium Manganate in Analysis.....X., 370
POTTSVILLE, PA., Mine Shaft.....IV., 108

PAGE
POWELL, F., Handling Coal in Anthracite Mines of Pennsylvania....IV., 100
PRECIOUS Stones....II., 58
PRECIPITATED Silver, Sweetening and Treatment....VII., 16
PRECIPITATION of Copper at Agordo....IX., 258
PRELIMINARY Surveys....VIII., 75; X., 1
PRESIDENT'S Report....III., 58
PROJECTED Intersections....I., 155
PROPERTIES of the Iron Carburets, Electrical and Magnetic....VII., 24
Prospecting, Cheap Shaft-Sinking for....III., 137
for Iron, Methods of....IV., 113
in Soft Ground, an Economical Method....X., 234
Prussian Base at Göttingen....IV., 230
Prussian Mines, Experiments and Improvements During 1880....III., 139, 214, 241
Przibram, Desilverization of Lead at....IV., 63
PRZIBRAM, Stamp Battery at....IV., 304
PSEUDOMORPHS of Quartz....VII., 334
PUBLIC Works, Thoughts on Practical Management....VI., 251
PUDDLER in Gold Mining....III., 82
Puddling Furnace....IV., 227
Pulp Mill Waste as Flux....IV., 141
PULP Slime, Difficulties of Treatment....IV., 305
PULP Washing for Chemical Fibre....X., 165
Pulsometers in Mines....IV., 243
PULVERIZER, the Dingey....IV., 306
Pump, Double-Acting Plunger....IV., 242
PUMPING in Marquette Iron Mines....III., 246
PUMPING Engines, Direct Acting....I., 173
Underground....V., 267
Pumps, Mine....IV., 243
PURIFICATION of Gold....VI., 246
of Silver....VI., 244
PYRAMID Hill of Gizeh....VI., 193
Pyramids of lake Mœris....VI., 130
PYRAMID, the Metrological System of the Great....V., 97, 193, 289
Pyrite and Blende, Separation of....III., 54
PYRITE Deposits of the Alleghanies....VII., 154, 218, 301
in Building Stones, Effect of....I., 34
in Coal....VII., 250
Sulphur Estimation in....V., 164
PYROLIGNEOUS Acid....IX., 177
PYROPHOSPHATE, Determination of Zinc as....III., 260

Q

QUALITATIVE Analysis, Scheme for....X., 255
by Electrolysis....X., 280
QUALITATIVE and Quantitative Tests, Phenol or Carbolic Acid....II., 49
Blowpipe Analysis....VIII., 359
Tests, Comparative Delicacy of....VIII., 366

PAGE

QUANTITATIVE Analysis of Iron-Ores....I., 127
Electrolysis....X., 374
QUANTIVALENCE of Carbon Molecule....II., 201
QUICKSILVER Deposits of California....IV., 294

R

Rackarock....III., 50
Rackroad....III., 217
RADFORD, W. H., A General Clean-up at the North Bloomfield Gravel Mine, V., 373
Rail-cambering Devices....IV., 43
RAILROADS:
ABT'S Railway....IV., 62
ACCIDENTS....VIII., 54
Berlin Stadtbahn....IV., 9
Block Signals....VIII., 54
BRAKE TESTS, The Burlington....VIII., 376; IX., 431
Cable Roads....IV., 146
Curves....III., 221; VI., 166
FROGS....V., 38
Life of Wheels....V., 268
Permanent Way....IV., 61
Resistance of Trains....VIII., 286
Rolling-Stock, Uniformity in....IV., 145
Surveying....IV., 139; X., 1
Switches....V., 38
Telpherage....V., 163
Ties, Preservation of....IV., 232
TRAMWAY....IV., 297
TURNOUTS....VII., 131
Wear of Steel Rails....II., 138
Wire-rope, in San Francisco....I., 187
RAINFALL Diagrams....IX., 228
of 1884, Chlorides in....VI., 335
on Land Surface of Globe....VIII., 380
Rammed Bottoms and Linings....IV., 143
RANDOLPH, J. C. F., the Pastrana Mine....II., 107
Some Mexican Notes....I., 105
Reason in the Cicada....VII., 152
RECOVERY System in Manufacture of Chemical Fibre....X., 167
Red Skies....V., 167
REDUCTION of Argentic Chloride with Zinc....VII., 266
of Ferric Iron....X., 278
of Ores at San Juan Mine....III., 268
of Stadia Measurements, Graphic Tables for....VII., 323
of Silver Sulphate by Copper....VII., 15
REED, S. A., on Ore Sampling....III., 253
More Remarks on Ore Sampling....VI., 351

PAGE

REES, B. FRANK, the Rees Rifle for Military and Sporting Purposes.....VII., 338
REES, J. K., Partial Solar Eclipse of March 16th.....VI., 261
Standard Time.....V., 136
Great Telescopes of the World.....VIII., 135
REFINING Copper.....VII., 187, 381; IX., 275
Gold and Silver at the New York Assay Office.....II., 18
Refuge for Miners, Places of.....IV., 244
Reheating Furnace.....IV., 227
RELIEF Clubs at Marquette Mines.....III., 251
Republic Mine. See Iron Mines.
Resistance of Railway Trains.....VIII., 286
RETAINING Walls, Colombs, Poncelets and Weyrauch's Theories.....IX., 109
Theories of the Lateral Pressure of Sand Against..... 109
the Theories for.....IX., 286
REULEAUX, PROF. F., the Influence of the Technical Sciences upon General Culture.....VII., 67
On New Features in Teledynamic Transmitters.....VIII., 93, 220
REVIEWS. See Book Reviews.
RICHARDS, F. H., Invention and Skill.....IX., 40
RICHMOND COUNTY, N. Y., Geology of.....II., 165
RIDSDALE, T. W., Handling of Coal.....IV., 100
RIFLE, the Rees.....VII., 338
RIGHT of Lateral Pursuit.....VII., 357
RITTER'S Arbitrary Assumption in his "Method of Moments," and the Resulting Restrictions.....IV., 86
RITTINGER Tables at Schemnitz.....IV., 317
RIVER and Bar Mining.....VII., 127
and Harbor Surveys, Notes on.....IV., 23
RIVERS, Improvement of the Wisconsin and Fox.....IV., 30
Rivets, Working Stress on.....VIII., 185
ROADS AND PAVEMENTS:
ASPHALT Pavement.....I., 137; X., 292, 294
BASALT Pavemeent.....I., 36, 63
Best Stones for ROADS.....I., 36, 63
BLUESTONE PAVEMENT.....X., 292
DIABASE Pavement.....X., 293
FLAGGING Stones.....I., 36
MACADAM Road.....IV., 236; X., 291
NICHOLSON Pavement.....X., 291, 294
PAVING Cements, Cohesion of.....X., 297
SANDSTONE for Roads.....I., 36
STREETS of New York.....I., 136; X., 289
Telford Pavement.....IV., 236
TRAP Pavement.....X., 293
ROASTING Copper-Ore at Agordo.....IX., 128, 134, 271
at Ducktown.....VII., 171
at Point Shirley.....VII., 364
ROCK-BREAKING.....IV., 185
ROCK-SECTION, Preparation.....X., 216

PAGE

ROCKS:
Apparatus for Separating Mineral Constituents....X., 284
Dike Rocks....IX., 372
Effusive....X., 43
FELDSPATHIC....VI., 1
GRANITE....I., 35, 53; X., 291, 292
METAMORPHIC of New York....II., 141
Neovolcanic....X., 52
Palæovolcanic....X., 51
Petrography, Modern....X., 212
Physiography of the Massive Rocks....IX., 362; X., 43
Plutonic....IX., 368
SANDSTONES....I., 36, 59
SLATE....I., 39, 61
TRAP....I., 63
Rockdrills, Improvement in....VI., 281
ROCKER....III., 82
Rock-Filled Deposits, Method of Working....IV., 56
ROLLER Mill, the Schranz....IV., 309
Rollers, Strength of Metallic....VI., 282
Rolling Loads, Concentrated....VIII., 317
ROLLING MILL for Copper, Mexico....IV., 125
ROLLING STOCK....IV., 145
ROLLS for Ore-Crushing....IV., 198, 200
ROOD, O. N., Color Contrast....VIII., 307
ROSENBUSCH, H., Microscopic Physiography of the Massive Rocks....IX., 362; X., 43
ROTATING Picking-Tables....IV., 195
ROUND Tables, Continuous....V., 14
Feeding Apparatus for....III., 297
RUNS, for Classification of Slimes....IV., 314
Russell Process at Marsac Mill....X., 185
Rusty Gold....II., 139
RUTTMAN, F. S., an Economical Method of Prospecting in Soft Ground....X., 234

S

SACK Fastener in Sampling....III., 256
Safety. See Mechanical Engineering.
SAGE, E. E., Gold and Silver Refining at the Assay Office, New York City....II., 18
St. Lawrence Bridge....VIII., 184
ST. LOUIS Coal Regions, Machine Mining in....IX., 299
SAMPLING of Ore....III., 253; VI., 351
SAND Blast....III., 110
Sand Chute....VI., 298
Sand Pressure Against Retaining Walls....IX., 109
Sandstone. See Rocks.
San Francisco, Wire Rope Railroads....I., 187
SAN JUAN Mine....III., 264

PAGE

SANITARY ENGINEERING. See also Sewerage and Ventilation.
Condition of City Houses....III., 21
Dam of Brickwork in Sewer Tunnel....III., 293
DRAINAGE of City Houses....III., 22; IV., 47
of New Brighton, Staten Island....X., 202, 302
Heating, Rival Systems....V., 259
Heating Surface in Ventilating Flues....III., 171
Peppermint Test....IV., 48
Problems of New York City....I., 131
SCHOOL-SINK *vs.* Privy-Vault....III., 22
SOIL Pipe, Ventilation....III., 23
Steam Heating....IV., 147
SUB-SURFACE Water Supplies....VIII., 191
TIDE-LAND, Reclamation of, at Marshfield, Mass....III., 118
Water Supply, New York City....IX., 380
SAXON Amalgamation....III., 101
Scaffolds and Engorgements in Blast Furnaces....III., 302
Scandium, New Metal....I., 85
SCHEME for Blowpipe Analysis....VIII., 359
for the Qualitative Separation of Al, Cr, Fe, Etc....X., 253
SCHEMNITZ, Treatment of Slimes at....IV., 301, 317
SCHÖNEY, E., Knickerbocker Avenue Sewer Outlet....IX., 178
SCHOOL OF MINES (Historical Review)....X., 338
Admission, Increasing Requirements....III., 56
Additions in Assay Laboratory....V., 64
Bulletin....X., 289
Chemical Society....V., 176, 280, 381
Effect of Age of Students Upon Scholarship....II., 222
Electric Lighting....V., 64
Engineering Society....V., 175, 280, 381
Fellowships in Chemistry....IV., 248; V., 65, 66
General Notes,
II., 220; III., 56, 147, 226, 307; IV., 64, 150, 247; V., 64, 173, 280, 389
Instruction in Architecture....III., 1; X., 29
New Building....III., 228
New Course in Assaying....V., 174
Observatory....V., 171
Ore Testing Works of the....VI., 224
Report of Committee on Increasing Requirements for Admission....II., 223
Summer School in Mechanical Engineering....III., 149; VI., 84
in Surveying....V., 281; VI., 85
in Practical Mining....VI., 84
SCHOOL-SINK *vs.* Privy-Vault....III., 22
SCHRANZ Roller Mill....III., 309
SCOOP-SHOVELS in Sampling....III., 256
SCRAMMERS....III., 200
SEA Waves at Krakatoa....X., 144

PAGE

SECRETION Theory of Filling of Fissure Veins ..... I., 100
SEDIMENTARY Origin of Champion Mine Deposit ..... III., 42
SEGREGATED Veins, Gold in ..... I., 96; III., 11
Selenium and Tellurium, Fractional Separation of ..... V., 278
SELF-ACTING Planes in Coal Mines ..... IV., 105
Self-Registering Ship's Compass ..... V., 155
SEMI-LIQUID Body, Determination of Cohesion of ..... X., 297
SEPARATE or Waring System of Sewerage ..... X., 207, 304
Separation. See Analytical Chemistry.
SEPARATOR, Paddock's Pneumatic ..... III., 129
SEWERAGE, Combined *versus* Separate Systems ..... X., 207
Sewerage of Boston ..... IV., 227
SEWER Outlet, the Knickerbocker Avenue ..... IX., 178
SEWER Tunnel Construction ..... IX., 180
SHAFT, Transfer of Line Down a ..... III., 270
at Leadville, Geological Section of ..... IV., 292
of Tilly Foster Mine ..... VI., 289, 293
the Westmoreland ..... II., 103
Loading Chamber in ..... IV., 242
HOUSE of Champion Mine ..... III., 204
Linings of Iron ..... IV., 241
Signalling ..... IV., 137
Sinking ..... III., 115, 117, 277
Through Loose Material at the "Tilly Foster Mine." ..... IX., 1
Pœtsch Method in Quicksand ..... V., 53, 154
Timbering ..... III., 115; IV., 242
Shaft Furnaces vs. Reverberatory Furnaces for Copper-Smelting ..... IV., 134
SHAKING Riddles for Sizing ..... IV., 188
SHARE, W. W., Analyses of Coffee ..... I., 13
Sheet Steel, Manufacture ..... V., 158
SHEETING-BOARDS in Barnum Shaft ..... III., 278
Siemens Furnace ..... V., 378
Sieve, Spiral ..... III., 297
Standard Sizes for Ore Dressing ..... II., 216
SIEVE Work" ..... IX., 77
SIGNAL Tripods for Trigonometrical Stations of New York State Survey ..... IV., 277
Signalling. See Mining Engineering.
Silica and Silicate. See Analytical Chemistry.
Silicates, Titanium in ..... X., 278
Silicious Bronze Telegraph Wires ..... V., 274, 275
Silicon. See Analytical Chemistry.
SILICON as an Element in Foundry Irons ..... I., 45; X., 148
SILT, Method of Tunnelling in ..... IV., 93
SILVER. See also Analytical Chemistry, Parting, Etc.
BARREL Amalgamation ..... III., 101
Casting ..... VII., 271
Chilian Mill ..... III., 92
Dry Stamping ..... III., 158

PAGE

SILVER—*Continued.*
DRYING Cylinder at Frisco....III., 128
Extraction by Wet Processes....III., 162
Future of....X., 97
Metallurgy....IV., 130
Parting at Lautenthal....VI., 240
Parting....I., 43
PASTRANA Mine....II., 107
PATIO, in Mexico....I., 109
Plating, Electro....III., 30
Production Since 1858....III., 165
Purification and Melting....VI., 244
from Alloys....IV., 238
Refining at New York Assay Office....II., 18
Russell Process, at Marsac Mill....X., 185
Veins....III., 13
VON PATERA Process at San Juan Mine....III., 268
SILVER Mines, the Pastrana....II., 107
the Bremen....VI., 140
of Mexico, Notes on Mining and Miners....I., 105
SILVER Ores, Concentration of on the Pacific Coast....VIII., 336
Treatment of....III., 101
Mexican Process for....I., 108; IV., 133
Treatment of at Batopilas....IV., 63; VI., 75
Treatment at Przibram in 1881....IV., 127
SILVER Sulphate Reduction by Copper....VII., 15
Reduced by Iron....VI., 242
SILVER Works at Ems....IV., 244
SINKING a Shaft Through Loose Material at the "Tilly Foster Mine."....IX., 1
of Shaft "B," Barnum Mine, Ishpeming, Mich....III., 277
"*Siphon Tap Case*"....VIII., 175
SIZES of Ore Produced in Crushing....IV., 310
SKILL *vs.* Invention....IX., 40
SKIP and Car....VI., 300
Slag Analysis....VI., 164
Slags and Silicates, Decomposition of....II., 145
SLAGS, Decomposition and Analysis of....V., 351
for Cement....III., 300; IV., 238
Manganiferous in Lead Smelting....V., 217
Utilization of Phosphoric....V., 161
Slate. See Rock.
Slimes. See Ore Dressing.
SLUICE, Battery....III., 94
in Placer Mining....III., 83; VII., 110
Smelting. See Copper.
SMELTING Gold and Silver Ores....III., 98, 159
Lead in Southeastern Missouri....IX., 212
Smoke, Furnace for Prevention....III., 49

PAGE

Snow, Removal in St. Petersburg.....III., 300
Soaking Pit, Improvement.....V., 273
SOAP, Manufacture of.....I., 119
Soap Test for Hardness of Water.....X., 283
Soda. See Analytical Chemistry.
SODIC Sulphate Test, for Building Stones.....I., 33
Sodium Formate as Reducing Flux in Blowpipe Analysis, Etc.....X., 190
SOIL Pipe, Ventilation.....III., 23
SOLAR Eclipse of March 16th, 1885.....VI., 261
SOLID Bodies, Movements in Water.....IX., 140
Solubility of Iodide of Mercury.....VI., 286
Solution for Mineral Separation.....V., 165
SOLUTION of Granulations at U. S. Mint.....VII., 10, 258
SORTING, Hydraulic.....IV., 298
SOUNDINGS, River and Harbor.....IV., 26
SOUTH, the Distillation of Pine Wood in the.....IX., 162
SOUTH CAROLINA Meteoric Iron.....VIII., 31
Mines of.....III., 211
SOUTH STAFFORDSHIRE, the Thick Coal of.....VII., 235
SOXHLETS Method, Determination of Sugar.....X., 13
SPALLING Ores.....IV., 183
Specific Gravity of Substances in Form of Powder.....X., 286
SPEED Indicator, Modification, Brown's.....I., 82
SPENCE Furnace.....VII., 232
SPIEGEL, Determination of Manganese in.....VI., 24
SPITZKASTEN.....IV., 315
SPITZLUTTE at Schemnitz.....IV., 318
Splicing Wire Rope.....III., 295
SPLITTER for Sampling.....III., 257
SPONTANEOUS Combustion in Coal Mines.....VII., 250
by HNO_3.....III., 302
"SPRAGGS,".....IV., 103
SQUARE Work in Coal Working.....VII., 242
STADIA Measurements, Graphic Tables for Reduction.....VII., 323
STADTBAHN, Some Notes Upon the Berlin.....IV., 9
STALL Roasting at Agordo.....IX., 134
Stall Roasting Vershire Matte.....VII., 306
STAMPS, Balls.....III., 93
Batteries.....IV., 30
for Fine Crushing.....IV., 301
at Przibram.....IV., 304
Dry.....III., 158
Pneumatic.....IV., 304
Standardizing Permanganate.....X., 371
STANDARD Time.....V., 136; VIII., 177
STAREK, EMIL, Line of Origin of the Charleston Earthquake.....VIII., 64
Patent Processes.....X., 102
STARR, C. D., High Bridge, New York.....X., 61
Mechanical Engineering and the Civil Engineer.....I., 148
Steam on the Canals.....II., 127, 182

PAGE
STARR, H. F., Determination of Total Carbon in Steel and Pig-Iron.....II., 290
STATIONARY Boilers, " Fuel Oil " for.....X., 350
STATISTICS, Tabulation by Electric System.....X., 238
STAY-BATTERY *vs.* Plain Screen.....IV., 320
STEAM on the Canals .....II., 127, 182
Steam Engine Indicator.....IV., 43
STEAM Hammers.....II., 35
Steam Heating.....IV., 147
Steam Pipe Covering.....II., 243
Water Rams in.....IX., 384
STEAM Pumps.....I., 173
in Marquette Mines.....III., 246
Steamer Athabaska.....V., 155
STEARNS, T. B., Iron Assay.....II., 173
Report of Mr. Thomas's Lecture on " Basic Process ".....II., 216
the Westmoreland Shaft.....II., 103
STEEL:
Carbon in .....III., 90; IV., 52
Effect of Manganese.....II., 139
for Iron, Substitution.....V., 157
Gases Contained in.....V., 224
Ingot Casting.....V., 273
Moulds.....V., 157
Notes on Bridge.....IX.. 248
Structural, Shop-Treatment of.....IV., 228
STEEL and Iron Column Formulæ.....IX., 80
STEEL Forgings, Haswell and Whitworth's.....VI., 216
STEEL Processes, Basic Open-Hearth.....VII., 49
Basic-Bessemer.....IV., 141; V., 169
Bessemer Improvements.....V.. 157
Chrome, New Method of Making.....V., 270
Crucible, Theory of.....V., 160
Open Hearth Dephosphorization at Creusot.....V., 54
Furnace, New Form.....V., 271, 378
Steel Rails, the Wear of.....II., 138
Steel, Sheet Manufacture.....V., 158
STETEFELDT, C. A., the Classics and Natural Science at a German Gymnasium, ...VII., 326
STIMULANTS and Narcotics.....I., 74
STOCK Piles.....III., 206
STOCKWORK, Deposits of Ore.....I., 92
STONE, GEORGE C., Note on *the Analysis of Iron Ores*.....I., 81
Analyses of Franklinite and Some Associated Minerals.....VIII., 148
Determination of Manganese in Spiegel.....VI., 24
Determination of Zinc as a Pyrophosphate.....III., 260
Stone Bridges vs. *Iron*.....VIII., 186
STONE HILL, Ala., Pyrite Beds.....VII., 223
STONES, Precious.....II., 58
STONY Lump, Model of.....VIII., 246

PAGE

Stoping with Diamond Drill.....II., 142
STRAINS, Graphic Calculation of.....I., 70
in Trusses.....VIII., 327
Maximum Bending Moment Under any Weight.....VIII., 321
Maximum Shear at any Point.....VIII., 320
Maximum Weight at Panel Points of Trusses.....VIII., 326
STREAMS, Flow of at the Upper Waters of the Mississippi and Vicinity.....X., 72
STREET Pavements of New York.....X., 289
STREETS of New York.....I., 136
Strength of Brickwork.....III., 299
of Iron Columns.....IV., 233
of Metallic Rollers.....VI., 282
of Stones.....I., 37
STRIKING Clock, Western Union.....X., 220
STROUHAL, VINCENT, the Electrical and Magnetic Properties of the Iron Carburets.....VII., 24
STRUCTURE of Bays Mountains, Tenn.....VIII., 242
STUART, W. H., in Camp on a Preliminary Survey.....VIII, 75
STUDENTS of Summer School in Mining, on the Iron Mines of New Jersey..IV., 111
on the Marquette Iron Region.....III., 35, 103, 197, 243
STUDIES, Elective.....VIII., 20
SUB-SURFACE Water Supplies.....VIII., 191
SUBLIMATION Theory of Filling of Fissure Veins.....I., 100
Sugar. See Analytical Chemistry.
Sugar Industry of Hawaii.....II., 212
SULPHATE of Copper Treatment at New York Assay Office.....VII., 18
Sulphur. See also Analytical Chemistry.
"SULPHUR".....IX., 76
Crystals on Blast-Furnace Cinder.....IV., 281
Treatment at Agordo.....IX., 138
SULPHURIC Acid Action on Lead and its Alloys.....II., 97, 177
Manufacture at Swansea.....IV., 127
Manufacture by Roessler Method.....V., 164
Treatment of Liquors at Lautenthal.....VI., 246
SULPHUROUS Anhydride on Benzine.....VIII., 253
Sundry Civil Bill.....IV., 290
SURFACE Heating, Required in Ventilating Flues.....III., 171
Surface Transportation by Narrow Gauge.....III., 216
by Wire Ropeways.....III., 216
by Rack-Road.....III., 217
SURVEY, New York State.....IV., 277
Great Basin.....IV., 294
in the West, Preliminary and Location Railroad.....X., 1
Lake.....IV., 229
of the Twenty-Third and Twenty-Fourth Wards of New York City.....IV., 138
River and Harbor.....IV., 23
the U. S. Geological.....IV., 284
SURVEYING: Alignment Croton Aqueduct.....IX., 191
Angle Measurement.....VI., 43; VII., 38

PAGE

SURVEYING: *Continued.*
Azimuth ..... VI., 41
Coördinate ..... IV., 136
Field-Work for Elevated Road Over a Crowded Thoroughfare ..... X., 84
Geodetic and Topographic ..... IV., 290: V., 173; VI., 37
Inaccessible Distances ..... III., 25
Longitude ..... VI., 39
Measurement of Base Lines ..... IV., 137, 230; VI., 51
Mines ..... III., 269
Mineral Survey ..... II., 124
Monuments ..... IV., 229, 280
Note Books ..... VI., 51
of Mining Claims in Colorado ..... II., 116
Office Work ..... VI., 54
Pacing ..... I., 1
Preliminary Camp ..... VIII., 75
Reading a Compass to Minutes ..... II., 29
Signals ..... IV., 139, 277
Tables for Stadia Measurement ..... VII., 323
Topographical ..... VI., 37, 45
Transit Work ..... IV., 135
Triangulation to Connect Spain and Algeria ..... I., 129
Vertical Sights ..... III., 270
SURVEYING Instruments, Improvised ..... VII., 145
Levelling Device ..... VIII.; 286
the Hanging Compass and Arc ..... V., 46
the Pedometer ..... I., 1
Plumb-Lines for Shaft ..... III., 271
Topographical Models ..... III., 294
Tripods ..... IV., 277
SUTER, G. A., Mine Surveying ..... III., 269
SWAIN, A. E., Underground Haulage in Pennsylvania Coal Mines ..... II., 194
SWEETENING of the Insoluble Gold Residue at New York Assay Office ..... VII., 1
Reduced Silver, U. S. Mint Work ..... VII., 268
Switches ..... V., 38
SYPHON Separator ..... IV., 299
SYSTEMS of Weight and Measure ..... IX., 193, 291

T

TABLES for the Determination of Minerals ..... VI., 339
Earnings and Expenditures of U. S. Mints and Assay Offices, 1884 ..... VII., 20
Graphic for Stadia Measurements ..... VII., 323
Losses on Sweep Sales, U. S. Mint ..... VII., 280
Percussion ..... V., 20
TABULATING by Electricity ..... X., 238
TAILINGS and Tail Sluices ..... III., 89
TAIL-ROPE Haulage in Pennsylvania Coal Mine ..... II., 198
Under Hoisting-Cages ..... III., 216

PAGE

TAILS, Concentration of.....III., 95
Tamping with High Explosives.....V., 266
Tannin in Barks and Extracts, the Estimation of.....V., 278
Tanning.....III., 302
TAPERING Ropes for Hoisting.....X., 261
TEABO Iron Mine.....IV., 117
TEA, Coffee, Cocoa, and Substitutes.....I., 87
TECHNICAL Sciences and General Culture.....VII., 67
TELEDYNAMIC Transmitters, New Features in.....VIII., 93, 220
Values, Table of.....VIII., 232
Telegraph Wires, Silicious Bronze.....V., 274
Telephone.....III., 216
Telford Pavement.....IV., 236
TELESCOPES of the World.....V., 135
TELL-TALES.....III., 244; IV., 108
Tellurium and Selenium, Fractional Separation.....V., 278
Telpherage.....V., 163
TEMPIUTE Mountain Marbles.....X., 70
TERRA-COTTA and Fire-Brick Manufacture.....I., 16
Testing Machine.....IV., 233
Tests by Hydrostatic Pressure.....VI., 167
Theories of the Lateral Pressure of Sand Against Retaining-Walls.....IX., 109, 286
THEORY of Jigging.....IX., 278
THERMAL Effect of the Action of Aqueous Vapor on Feldspathic Rocks.....VI., 1
THICK Coal of South Staffordshire.....VII., 235
Thomas-Gilchrist "Basic Process," Report of Mr. Thomas's Lecture.....II., 216
THRUST and Strain, the Relation of in Arches.....VI., 209
THURSTON, R. H., Flint's Investigation of the Nicaraguan Woods.....IX., 6
Theories for Retaining-Walls.....IX., 286
TIDE-GAUGE.....IV., 25
TIDE-LAND, Reclamation of, at Marshfield, Mass.....III., 118
Tie-Rods, Expansion in Brickwork.....III., 297
TILLY-FOSTER MINE, Masonry Supports for the Hanging Walls.....VI., 289
TILTED Transit for Transferring Line Down a Shaft.....III., 273
Timber, Preservation of.....IV., 232
Rails as Substitute for.....IV., 242
TIMBERING of Shaft "A," Barnum Mine.....III., 115
Underground Road in Collieries.....IV., 58
TIME, Standard.....V., 136
TIME System of Western Union.....X., 218
Tin. See Analytical Chemistry.
Changes in Structure of Ingots of.....IV., 226
TIN Mines, Banca.....VII., 99
Titanium. See Analytical Chemistry.
Titration. See Analytical Chemistry
TOPOGRAPHICAL Field Work.....VI., 45
TOPOGRAPHIC Surveying.....VI., 37, 45
TOPOGRAPHY of Bays Mountain, Tenn.....VIII., 242
Glacial.....VI., 144
Models.....III., 294

PAGE

Torpedo Boat.....V., 268
TORSION Tests.....IX., 29
TOTAL Carbon, in Steel or Pig-Iron.....III., 290
TOWN'S Truss for Bridges.....IX., 315
TRACK, Turnouts from Combination.....VII., 131
TRANSIT Work, the Best System for.....IV., 135
TRANSMITTERS, Teledynamic, New Features.....VIII., 93, 220
TRANSPORTATION, Underground, in Pennsylvania.....IV., 103
TRANSVERSE Stress Tests.....IX., 20
TRIANGULATION Between Spain and Algeria.....I., 129
Reconnaisance.....VI., 42
TRAP Pavement.....X., 293
TRAP Rocks, Porphyry, Basalt, etc., as Building and Road Materials.....I., 63
TRIGONOMETRICAL Stations, Signal Tripods for.....IV., 277
TRINIDAD Asphalt.....X.. 295
TRIPODS, Signal, for State Survey.....IV., 277
TROMMELS, Arrangement of System of.....IV., 192
TROWBRIDGE, W. P., Comparison of Cost in Exhaust and Plenum Ventilation for Mines and Dwellings.....VI., 82
Determination of Heating Surface Required in Ventilating Flues.....III., 171
Intercollegiate Boat Racing.....VIII., 368
Relative Economy of Ventilation by Heated Chimneys and by Fans...VII., 347
Sanitary Problems of New York City.....I., 131
Stone Cutting.....IV., 265
Sub-Surface Water Supplies.....VIII., 191
the Bisulphide of Carbon Engine.....VII., 210
Town's Truss.....IX., 315
Value of Water-Power Considered in Relation to Indemnity to Riparian Owners when the Water of a Stream is Taken for Public Use.....IX., 220
TRUSS, Town's.....IX., 315
TRUSSES, Computation of Strains by Dynagraphometer.....I., 70
Tubing in a Gangway, Cast-Iron Watertight.....IV., 57
Tungsten in Alloys, Determination of.....X., 373
Tunnel, Arlberg.....V., 154
of the Sixth Century B.C.....VI., 264
Hudson River.....IV., 90
Tunnelling.....IX., 191
Caissons for.....IV., 97
in Unsafe Ground.....IV., 93
in Knickerbocker Avenue Sewer.....IX., 180
TURBINE Wheels Used in Hoisting.....III., 245
TURNOUTS from Combination Track.....VII., 131
TUTTLE, EDGAR G., Turnouts from Combination Track.....VII., 131

U

UNDERCURRENT in Sluice.....III., 84
Underground Electric Conductor.....V., 273
Haulage by Locomotives.....II., 214
Haulage in Pennsylvania Coal Mines.....II., 194

PAGE

Underground Loading Chamber....IV., 242
Pumping Engines....V., 267
Separation of Ores....IV., 181
UNDERHAND Stoping....III., 111
Underpinning of Quay Wall at Gosport Navy Yard....V, 52
UNEDUCATED Reason in the Cicada....VII., 152
UNITED STATES Assay Office, N. Y., Parting Gold and Silver....VII, 1
Coins, Weights, Etc....VII., 278
Mint, Philadelphia, Parting Process....VII., 253
Geological Survey....IV., 284
Progress of the Metallurgy of Gold and Silver in....III., 71, 157
Working Placer Deposits in the....VII., 101
UNITED Strain and Thrust in Arches....VI., 209
UNITS, the Relation of Electrical and Dynamic....IX., 341
Universal International Exposition of 1889....X., 275
Use of Bore-Holes for Rope, Steam, and Water-Ways....IX., 189
UTE and Ulay Mines....IV., 4

V

VACUUM Brake, Eames Automatic....IX., 44
Vanadium in Ceylon....IV., 239
VAN AMRINGE, PROF. J. H. The School of Mines....X., 338
Vapart Centrifugal Disintegrator....III., 55
VEINS, Mineral, Classification of....I., 96
Ventilating Machines....III., 218
Ventilation, by fans and blowing engines....IV., 237
by Heated Chimneys and by Fans....VII., 347
Comparison Exhaust and Plenum....VI., 82
Determination of Required Heating Surface in Ventilating Flues....III., 171
Need of Improved....I., 133
of Cellars....III., 24
of Soil Pipes....III., 23
VERMONT, Copper Deposits....IV., 219
VERSHIRE Copper Mines....VII., 301
Matte Stall....VII., 306
Ore Furnaces....VII., 304
VERTICAL Sights....III., 270
V-GEARING....III., 245
Victoria Gold Quartz Reef,....V., 166
VOLCANOES....X., 133
VOLCANOES as Measurers of Thickness of Earth's Crust....VIII, 12
VOLUMETRIC Determination of Sulphuric Acid....I., 166, VIII., 187
of Boracic Acid....V., 58
of Iron....V., 165
of Copper....II., 23
of Mercury....V., 279
VONDY, R. H., Sinking of Shaft "B," Barnum Mine, Ishpeming, Mich.,....III., 277
VON PATERA Process at San Juan Mine....III., 268

PAGE

VULTÉ H. T., a Scheme for Qualitative Separation....X., 255
Precious Stones....II., 58

W

WAGES at Lake Superior Mine....III., 249
WALKER, A. L., on Hudson River Tunnel....IV., 90
WALL Papers....II., 27
Arsenic in....X., 280
WALLER, E., Kjeldahl Process for the Determination of Nitrogen....IX., 240
the Modulus of Hydrometers....VI., 153
Phenol or Carbolic Acid....II., 49
Abstracts, Analytical Chemistry....X., 276, 370
the Lundberg Case....X., 193
WARE, PROF. W. R., Proposed Course of Architecture....III., 1
the Instruction in Architecture at the School of Mines....X., 29
WARING System of Sewerage....X., 304
Waste Slimes, Saving of Mineral....III., 297
Water. See Analytical Chemistry.
WATER Consumed in Stamping....IV., 303
Flow of, in Pipes....III., 299
Movement of Solid Bodies in....IX., 140
Water-Jacketed Furnaces....IV., 126
Water-Pipes, Device for Cleaning....V., 52
at Michigamme Mine....III., 246
WATER-POWER, Appraisement of Damages to....IX., 220, 319
Hoisting on Inclined Planes by....VI., 283
in Mines....IV., 242
Used in Hoisting....III., 245
Water-Pressure Engine for Pumping....IV., 243
Water-Rams in Steam Pipes....IX., 384
Water Supply, New York City....IX., 380
Sub-Surface....VIII., 101
WATER-WHEEL at Morris Canal Inclines....III., 285
Waterproof Paint for Textiles....IV., 238
Watertown Arsenal Testing Machine....IV., 233
WATTS, HENRY, Fund for....VI., 160, 280
WEIGHT and Measure, Systems of....IX., 193
WELLS, J. S. C., a Scheme for Qualitative Separation....X., 255
Comparison of the Delicacy of Certain Qualitative Tests....VIII., 366
WENDT, ARTHUR F., the Pyrites Deposits of the Alleghanies....VII., 154, 218, 301
WESTERN Union Time System....X., 218
WESTINGHOUSE Automatic Electric Air Brake....IX., 47
WESTMORELAND Shaft....II., 103
WET Processes for Silver....III., 162
WEYRAUCH'S Theory of Retaining Walls....IX., 110
WHEELER, H. A., Direct Acting Pumping Engines....I., 173
Machine Mining in the St. Louis Coal Region....IX., 299
WHITE Marbles of Utah and Western Colorado....X., 71

PAGE

WHITE River Country Coals....IX., 340
WHITEHOUSE, COPE, Mœris, the Wonder of the World....VI., 71
Island Pyramids in the Lake of Mœris....VI., 130
the Pyramid-Hill of Gizeh....VI., 193
WIECHMANN, F. G., Chemical Action of Light....II., 42
Coffee and its Adulterations....I., 8
Determination of Invert-Sugar by Alkaline Copper Solutions....X., 11
the Writing of Chemical Equations....V., 235
the Inversion Process Applied to Beet Root Sugar....VI., 257
WILLIAMS, W. F., Wire-Rope Railroads in San Francisco....I., 187
WILLIS, BAILEY, Graphic Tables for Reduction of Stadia Measurements....VII., 323
Marble of Hawkins County, Tenn....IX., 112
our Grandest Mountain and Deepest Forest....VIII., 152
Topography and Structure in the Bays Mountains, Tenn....VIII., 242
WILSON, HERBERT M., the Inclined Planes of the Morris Canal....III., 283
Geodetic and Topographic Surveying....VI., 37
WINDING Drum at Morris Canal Incline....III., 285
WINDING Engines....X., 258
WINDMILL for Storing Electric Batteries....IV., 42
WIRE-ROPE Railroads in San Francisco....I., 187
in Pumping....III., 246
Splicing of....III., 295
Wire Rope-Ways....III., 216
WISCONSIN aud Fox Rivers, Improvement....IV., 30
WITTMACK, C. A., Electro-Silver-Plating....III., 30
Wooden Dams....VIII., 186
WOOD Pavement....X., 291, 294
in Mines....IV., 243
WOODS, Flint's Investigation of the Nicaraguan....IX., 6
Work, Cost with Various Motors....III., 300
WORKING in Thick Deposits of Iron-Ore....IV., 9
Placer Deposits in the United States....VII., 101
Steep Coal Breasts....IV., 102
Working Stress on Rivets....VIII., 185
WRITING of Chemical Equations....V., 235

Y

YIELD of Coal per Acre, per Foot, by Various Methods....VII., 249
Ytterbia, Spectrum of....I., 42

Z

Zinc and Iron, Relative Expansions....IV., 231
ZINC. See Analytical Chemistry.
Zinc Desilverization....III., 161
Zinc Foil in Boilers....IV., 43
ZINCITE Analyses....VIII., 149
Zirconium and Aluminum, Separation of....X., 276

Registered at the New York Post Office as Second-Class Matter.

THE

SCHOOL OF MINES QUARTERLY.

A

JOURNAL OF APPLIED SCIENCE.

CONTENTS AND INDEX,

VOLUMES I to X.

NOVEMBER, 1879, TO JULY, 1889.

COLUMBIA COLLEGE.

NEW YORK CITY.

1890.

THE SCHOOL OF MINES QUARTERLY,

COLUMBIA COLLEGE, - NEW YORK CITY.

The "QUARTERLY" is the *property* of the Alumni, Engineering and Chemical Societies of the School of Mines, Columbia College. It is not, however, a record of the meetings of these societies, but a journal of Applied Science, open to all contributors. The articles it contains are usually upon Engineering, Chemical and Metallurgical subjects, and less frequently upon Economic Geology and Mineralogy, etc.

Subscription price **Two Dollars** per year, payable in advance. Back numbers at fifty cents per copy. Address as above.

ORFORD COPPER CO.,

COPPER SMELTERS.

Works at Constable's Hook, N. J., opposite New Brighton, Staten Island. Copper Ore, Mattes, or Bullion purchased. Advances made on consignments for refining and sale. ***Specialty made of Silver-Bearing Ores and Mattes.***

SELL

INGOT AND CAKE COPPER.

President, ROBERT M. THOMPSON,

Office, 37 to 39 Wall Street, New York.

A. R. Chisolm & Co.

BANKERS & BROKERS,

61 BROADWAY, NEW YORK.

RAILROAD STOCKS, | MINING STOCKS, | OIL,

and all other Securities that are dealt in on New York, San Francisco, Philadelphia or Boston Exchanges, bought and sold for cash or on margin. Loans made on Railroad and Mining Stocks at low rates of interest. Interest allowed on deposits.

[Established 1876.] Weekly Circular free.

In preparation, ready in June, 1890, **The Washington Bridge** over the Harlem River, at 181st Street, New York City. Known during construction as the Harlem River Bridge and Manhattan Bridge. A description of its construction by WILLIAM R. HUTTON, Chief Engineer. Illustrated with thirty double and single page photo-gravure plates, twenty-four double page lithographs and other engravings. Published with the approval of the Harlem River Bridge Commission. Price, **$5.00,** postage paid.

LEO VON ROSENBERG, Publisher,

35 BROADWAY, NEW YORK CITY.

The Vosburg Tunnel.—A description of its construction. Illustrated by seventy-two engravings and maps. Price, $1.00, postage paid.

Leo Von Rosenberg,

35 Broadway, - New York City.

DESIGNER AND PUBLISHER OF

MINING and RAILROAD MAPS.

REPORTS, BOOKS, CATALOGUES, ETC.

MAPS PHOTO-LITHOGRAPHED AND PRINTED.

Drawings and Engravings of every Description.

Will collect data for descriptions and illustrations of works built or in course of construction, for publications, etc., and will visit such works, for the purpose, in any section of the country.

WHITALL, TATUM & CO.,

MANUFACTURERS OF

DRUGGISTS' AND CHEMISTS'

GLASSWARE.

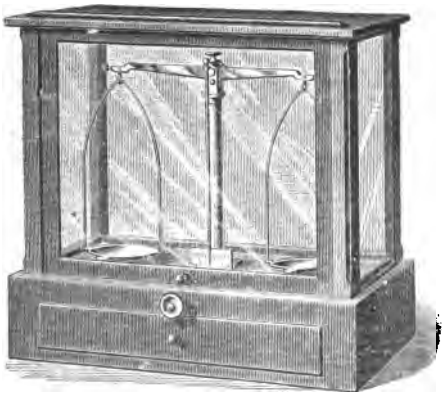
MANUFACTURERS AND JOBBERS OF

DRUGGISTS' SUNDRIES.

GLASSWARE FOR LABORATORY USE,

SCALES AND WEIGHTS,

WEDGEWOOD AND PORCELAIN ARTICLES, ETC.



No. 20 Beam Scale.

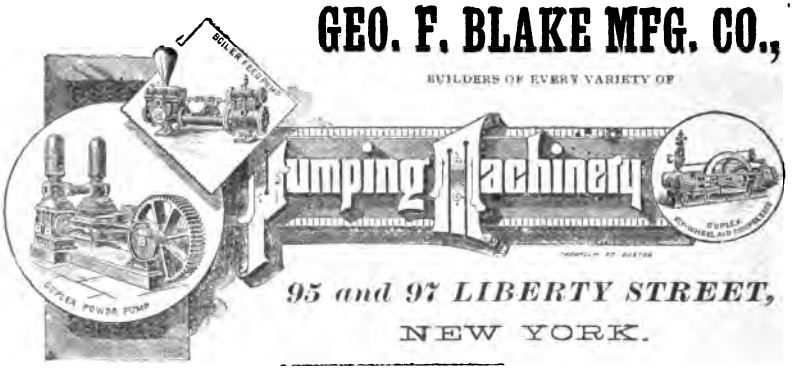
MILLVILLE CHEMICAL JAR.

A substitute for Woulff Bottles, Chemical Flasks, &c.

WHITALL, TATUM & CO.,

NEW YORK,	PHILADELPHIA,	BOSTON,
46 & 48 Barclay St.	410-414 Race St.	41 & 43 Broad St.

CATALOGUES SENT ON APPLICATION.



GEO. F. BLAKE MFG. CO.,

BUILDERS OF EVERY VARIETY OF

Pumping Machinery

95 and 97 LIBERTY STREET,

NEW YORK.

SEND FOR ILLUSTRATED CATALOGUE.

Wheeler's Patent Surface Condenser

FOR STATIONARY AND MARINE ENGINES.

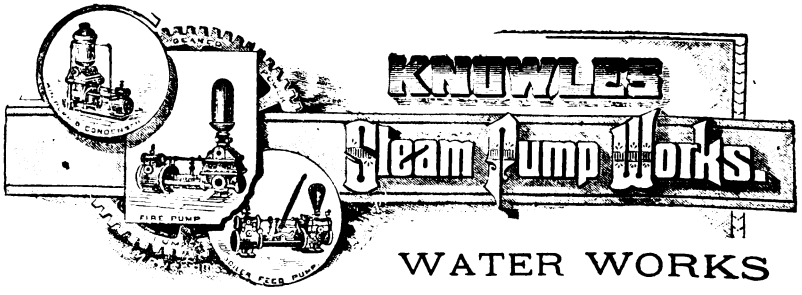
NO FERULES OR TUBE PACKINGS OF ANY KIND.

ALWAYS TIGHT AND READY FOR USE.

WHEELER CONDENSER and ENGINEERING WORKS

93 LIBERTY ST., NEW YORK.

N. B.—The ***WHEELER SURFACE CONDENSER*** is used as a test condenser for the instruction of students in testing steam engines in the Mechanical Engineering Departments of the following colleges: Stevens Institute, Cornell, Harvard, Mass. Institute of Technology, Penn University, Worcester Poly. Inst., University of Michigan, Iowa Agricultural College, and Penn. State College.



WATER WORKS

PUMPING MACHINERY AND STEAM PUMPS

FOR EVERY POSSIBLE USE.

Send for Illustrated Catalogue.

93 Liberty Street, New York.